The Builder.

Vol. LII No. 2294. Saturday, January 22, 1887.

ILLUSTRATIONS.

American Domestic Architecture 150
Illustrations to a Cluster of Decorative Artists 151
Tanagra Terra Cottas.—As Reproduced by Messrs. Bellman & Ivey 154
Design for Assize Courts for a Country Town: Royal Academy Upper School Prize, 1886.—By Mr. S. B. Russell 155
American Church, Paris: Further Details.—The late Mr. G. E. Street and Mr. Arthur E. Street, Architects 158-159
Map of London and Suburbs, showing the Boundaries of the Surveyors' Districts: Section IV.

CONTENTS.

The Royal Commission on Depression of Trade 139
The R.I.B.A. Competition Drawings and Designs 140
Architecture by Administration 141
Notes 141
Gower-street 143
A Cluster of Decorative Artists 144
The Treatment of Sewage 146
"The Conversion of England": A Drama with Historical Costumes 147
Salt for Removing Snow 147
Competitions 147
Map of London showing the Boundaries of Surveyors' Districts 147
American House Architecture 147
Tanagra Terra Cottas 148
Design for Assize Courts 148
American Church, Paris 148
Royal Institute of British Architects: Award of Studentships, Medals, and Prizes 161
Artesian Water Supply in London 161
The United Arts Club 162
A Reversible Rim-lock 162
A New Method of Street Paving 163
Architectural Societies 163
Obituary 163
Cement Tests 164
Taxation of Chimneys and Smoke Purification 164
"Sanitary Institute of Great Britain Examinations" 164
Historic City Buildings 165
Class of Masonry, City and Guilds Technical Institute 165
Colonial 165
"Masons' Wages" 165
Church Building News 165
The Student's Column: Field Work and Instruments.—IV. 166
Books: Lloyd's Engineer Studies (Chapman & Hall); How I Managed my Estate (Bell & Sons); Timber Trade Handbooks; Gowans's Model Dwelling-houses (Constable & Co.); Fawkes's Horticultural Buildings (Swan & Co.); Richardson's Art of Architectural Modelling in Paper (Lockwood & Co.); Facey's Practical House Decoration (Lockwood & Co.); Eagles's Constructive Geometry of Plane Curves (Macmillan) 167
Recent Patents 167
Meetings 168
Miscellanea 168
The Russian Petroleum Industry 168
Prices Current of Building Materials 169

The Royal Commission on Depression of Trade.

THE Report of the Royal Commission on the Depression of Trade is not in its main section a very strong or decisive document, and it is rendered still less so by the result, not uncommon in the case of commissions of this kind, that the members of the Commission cannot sufficiently agree together as to the bearing of the evidence laid before them to enable them to join in one Report, and that a Minority Report is appended, signed by four of the members, differing in certain very important points from the conclusions of the majority, while one of the minority, Lord Dunraven, himself dissents from the dissenters to a certain extent.

Taking the Reports as published last Saturday in the *Birmingham Gazette* as correctly given (they are not, we believe, as yet available to the public in Blue-book form), the main distinction between the majority and the minority Reports is that the signatories to the latter regard the main Report as too optimistic and as not taking sufficiently into account the permanent character of some of the influences that are at work, adverse to the interests of labour. But the most important distinction in principle between the two Reports is that, while the majority are of the pure faith in regard to Free Trade, the minority distinctly suggest the policy of answering protection by protection. They avoid, it is true, absolutely suggesting this as a principle in so many words, and Lord Dunraven dissents even from the suggestion of it, which, as he very truly says, "is clearly indicated in certain portions of the Report"; but that is what it comes to.

The main Report is drawn up in a logical progression, giving facts as supposed to be ascertained; probable causes; suggested remedies. It is impossible to follow the document into all its ramifications, but we may take note of the principal heads of the conclusions arrived at. The Report is not unjustly characterised by the dissenting minority as too favourable in its conclusions and somewhat masking the gravity of the situation. It admits, however, the existence of a condition of trade and industry in this country "which may fairly be described as depressed," meaning by depression a "diminution or absence of profit with a corresponding diminution in employment for the labouring classes." Those who chiefly complain of diminution or absence of profit are the large producers of goods and employers of labour; the Report entirely supports the view, which is pretty evident without any Commission, that the labouring classes are suffering not from any marked diminution in the rate of wages so much as from the want of full and regular employment and wages. "Those who are in the receipt of fixed salaries or who draw their incomes from fixed investments have apparently little to complain of"; one of those somewhat too self-evident propositions which meet us occasionally in the Report.

The chief features of the commercial situation are summed up thus:—

(*a*) A very serious falling off in the exchangeable value of the produce of the soil;

(*b*) An increased production of nearly all other classes of commodities;

(*c*) A tendency in the supply of commodities to outrun the demand.

(*d*) A consequent diminution in the profit obtainable by production. And

(*e*) A similar diminution in the rate of interest on invested capital.

The diminution in the rate of profit obtainable from production, whether agricultural or manufacturing, has given rise to a widespread feeling of depression among all the producing classes."

Of these it is evident that the two first are the most important items of the summary, having a direct relation to one another in so far as the disposal of the products of manufacture within this realm is concerned. As the Report says in another section:—

"The purchasing power of a large portion of the community,—that, namely, which depends directly upon the productive capacity of the soil,—has been seriously crippled. Bad seasons and the competition of the produce of other soils which can be cultivated under more favourable conditions than our own, have reduced the quantity or the exchangeable value of the commodities which the agricultural classes have to offer for the products they desire. Meanwhile, a process of an exactly opposite kind has been going on in other branches of industry.

Most of those commodities, the production of which is independent of the seasons and of the natural qualities of the soil, have been produced in steadily-increasing quantities.

Machinery is being continually made more perfect, new processes which cheapen the cost of production are being continually introduced, and the quantity of this class of commodities which is annually placed upon the market is thus steadily increasing.

This tendency, which is, under ordinary circumstances, perfectly natural and usual, has been intensified in recent years owing to the stimulus given to production by the great demand for all manufactured goods which followed the war of 1870-71.

A demand which was only temporary, and which might have been satisfied in the course of a very short period, was treated as if it were of a permanent character; and manufacturers in this country and elsewhere enlarged their power of production accordingly, as if the demand could be expected to continue. This it might very possibly have done if it had not been checked by the falling off in the productive power of the soil above alluded to."

We are thus brought back to the old orthodox faith of the political economist, that "the soil is the ultimate source of wealth." Its present poverty in our country is partly due to causes beyond human control; how far its future improvement may be within human control is suggested by the author of the article in the current number of the *Edinburgh Review*, on "English Land, Law, and Labour":—

"If rents are to be permanently reduced, landlords must become their own agents. If increased production is to afford the remedy for agricultural collapse, scientific training is required by the tenant-farmer. If the soil is to be tilled by a peasant-proprietary, preparation must be made to educate them for the task. Thus, from every point of view, education becomes an indispensable condition in the future of agriculture. In England little provision is made to supply the want. Our manufacturers woke from their dreams of industrial supremacy to find that technical schools on the Continent had, in a few years, counterbalanced the advantages this country had gained from an early start. It is not impossible that our agriculturalists may, from the same cause, find themselves left behind in the race."

Considering the question of over-production in the abstract, the Report (which harps pretty constantly on this string) observes that if the aggregate quantity of commodities produced is on the increase, and is growing at a more rapid rate than the population, the depression in particular industries, or among particular producers, is no indication of a corresponding national loss. This certainly strikes us as a curious way of putting the matter, if the reference is to produce in manufactured goods, as from the context it appears to be. The old distich about "the real worth of anything" surely holds good here: the production of manufactured goods for which there is not a market would seem to be a draining of the national resources rather than an addition to the national wealth. The remark seems the more unexpected as the Report fully admits the difficulty in finding a sufficient market, and is in fact largely occupied in suggesting the reasons for this restriction of the market, and the means to be adopted to revive and extend it. It is observed that the remarkable feature of the present situation is the length of time during which over-production has been carried on, after the stimulus received during a period of exceptional demand. But the statements in the Report itself seem to show that what has happened has not been so much a continued and systematic over-production (indeed no one, it may be said, overproduces systematically) as a continued process of closure of foreign markets by the combined influence of severe competition and foreign protective tariffs, to the influence of which our producers have only gradually had their eyes opened by the logic of facts:—"Our

trade with foreign countries is becoming less profitable in proportion as their markets are becoming more difficult of access owing to restrictive tariffs." This is very plainly put, and, on the face of it, appears certainly to count one to the arguments of the supporters of that vague ideal which is known as "fair trade." Seeing this *crux* of the question put forward in so plain a manner, we naturally looked for some definite expression of opinion in the portion of the Report devoted to remedies, as to the method of meeting this difficulty, but in vain. While the facts of the effect of foreign tariffs are admitted, the subject is to all appearance studiously shirked in the recommendations of the Report, and from a note of dissent by one of the Commissioners, Mr. Jamieson, we gather that this was from a disinclination to enter into the merits of the question of Free Trade *versus* Fair Trade. Now in so far as that the Commission are true to their Free Trade colours we are with them, but inasmuch as the effect of foreign protection is so plainly referred to as an adverse agency, it would seem as if the Commission hardly manifested the courage of their opinions in avoiding any further consideration of the subject, or any attempt to remove from the Free Trade policy the apparently damaging effect of their admissions. "This was looked for at their hand, and this was baulked." It is on this point, as we have observed, that the minority Report has its chief difference with that of the majority. The minority consider that any industry contending against the insuperable difficulties "artificially created by the legislature of foreign States" must sooner or later fall into a condition of languor, capital and talent being gradually withdrawn from it. The minority Report, indeed, admits that it would be "an act of suicidal folly to attempt to counterwork these influences by a like system of enormous import duties"; but "a slightly preferential treatment of the food products of India and the Colonies over those of foreign nations would, if adopted as a permanent system, gradually but certainly direct the flow of food-growing capital and labour more towards our own dependencies and less towards the United States than heretofore." "Preferential treatment" is an admirable phrase, like "remuneration" in "Love's Labour's Lost," and the use of it shows the fear that the minority have of being numbered with the unbelievers; but, of course, it is only a roundabout term for protection, and it is not surprising that Lord Dunraven should have added a special note to repudiate any share in it on his part. That foreign protection is an injury to our national pocket at present we hold to be undeniable; but, for nations as well as individuals, there are other interests besides the pocket, if one may still be permitted to say so. There can be, we hold, no possible question that Free Trade is for the good of the world generally; for the good of commerce, for the good of enterprise, for the good of that healthy life which is based on the principle "let the best man win"; only a large proportion of the world does not see it yet; does not see that the thing called "Fair Trade" is a mere arbitrary convention by which A agrees with B, "You rob me, and I will rob you, and we will each agree how much we will rob each other, so it will be all fair." It is to the credit of England to have been the first to see the fallacy and stupidity of this arrangement, and if we are temporarily losing by it in funds, we are at least taking an honourable lead in the right direction, which we can ill afford to drop, considering how lamentably we are behind in some less honourable things, such as the art of making war; nor do we know how soon we may have occasion to note the deadening effects of protection on national spirit and enterprise in the case of nations which are now filling their pockets temporarily at our expense. The faith in Free Trade is one to which the civilised world is certain to come round sooner or later; and though we should have liked to have seen the authors of the Report before us express themselves definitely on the subject, with a *liberavimus animas meas*, we at all events feel grateful to them for sticking to their guns.

In connexion with this part of the subject, we may notice the curious little demonstration which Professor Bonamy Price, one of the majority, has made in regard to the limitation of hours of labour, and which has drawn down upon him the wrath of the *Pall Mall Gazette*. In reference to a paragraph in which it is observed that shorter hours of labour, however they may increase the cost of production, are compensated for by the other advantages they afford to the working classes, he says this is "specific repudiation of the great doctrine of Free Trade. Shorter hours of labour do not and cannot compensate to a nation for increased cost of production and diminished output. They tax the community with dearer goods in order to confer special advantages on the working man. They protect him, and that is a direct repudiation of Free Trade." Now, we are with this, in so far as it is opposed to the absurd principle which has been put forward occasionally at Trades' Union Congresses, and on which we have before commented, that the position of the industrial classes, commercially, could be benefited by doing less work and getting more hands to do it. But the idea of "Protection" in respect to this can only be sustained in the case of Government limitation of hours. Now, the majority Report distinctly repudiates any such suggestion. What it says is, that "it is for the country and the working man to consider whether the advantages of shorter hours compensate for the increased cost of production or diminished output. We believe that they do, and on social as well as economic grounds we should regret to see any curtailment of the leisure and freedom which the workman now enjoys." It may, perhaps, be said that these remarks are *ultra vires*, strictly speaking, of the Commission, which was not deputed to consider the social status of the working classes. But certainly the choice of the working man to limit his hours, though it may be carried so far as to be a mistake in his own interests, has nothing to do with "protection" in any sense, and the protest seems uncalled for in relation to its antecedents.

In the main, the suggestions for the amelioration of the present state of things, as made in the majority Report, are healthy and spirited in tone. They suggest (1) cheapening the cost of production in so far as it is consistent with the maintenance of sound quality and good workmanship. Of course, in reference to the matter touched on in the last paragraph, this negatives the idea of any further reduction of hours of work, in regard to which, in fact, the "working classes" have the advantage of many other workers in the community, whose labours extend through a greater period of the twenty-four hours than theirs, and have no specified limit. (2) Increased vigilance in the look out for new markets and in keeping our place therein. (3) Improved technical education; on which head all who know are agreed. (4) Diplomatic and consular assistance in regard to the wants and opportunities of foreign markets: in regard to which there is a salutary caution added, that while all general information of this kind should be looked out for and made public by consular representatives (which part the German consuls seem to be very actively taking), any direct interest of diplomatist or consul in the work of special firms should be entirely discountenanced, lest the said officials should sink into the position of being "agents" in another and by no means desirable sense. (5) Statistics of internal trade, which are reported as very deficient. (6) In regard to railway and canal transport, it is suggested that greater facilities should be given for ascertaining the rates which the companies profess to charge, together with any modification of those rules which they make in favour of any individuals or classes; that the canal system should be further developed, and that no railway company should be allowed, either directly or indirectly, to control or own a canal; and that every facility should be afforded for the construction of light railways or tramways, for reducing the cost of transport. In a general way, however, we may observe that railways are regarded with a rather notable leniency by the Commission, which almost shuts its eyes to the complaints as to the preferential rates for Continental merchandise, about which a good deal has been heard lately.

We are also struck with the exceedingly indulgent view taken as to the forcing up of wages by the action of the Trades' Unions. It is curious to read in one sentence that while the aggregate share in the wealth which falls to labour has increased, that falling to capital has diminished; "in other words, that while wages have risen profits have fallen"; and that "this is obviously a process which cannot be continued beyond a certain point"; and to read in the next sentence that the unfavourable elements in the existing condition of trade and industry cannot with any justice be attributed to the action of Trades' Unions. We shall be curious to see what is the nature of the evidence on which this conclusion is founded. We attach, of course, no moral blame to the efforts of the Trades' Unions to keep up wages. They were organised to do the best they could for the interests of their class; but that, in pushing this too far without regard to the state of the times, they have to a considerable extent checked the employment of capital in England and brought in foreign labour to their own detriment, seems undeniable; and it is to be regretted that this important question was apparently rather lightly dismissed by the Commission.

THE R.I.B.A. COMPETITION DRAWINGS AND DESIGNS.

THE exhibition of architectural students' work now open in the Conduit-street Galleries is one of the best, if not quite the best, that we can remember. The competition for the Owen Jones Studentship especially has brought together a number of sketches and studies which, both in quantity and quality, make a valuable addition to the usual collection, and the older competitions have mostly been well contested. The winner of the Owen Jones Studentship, Mr. Sydney Vacher, has submitted a large number of sketches of colour decoration, in all styles and periods, and collected from a great variety of sources, in all of which the colour is shown in its full strength, just as it really is or was intended to be, without taking account of accidental effects of light or time, sketches which are not and are not intended to be attractive in themselves, but scrappy, dirty, covered with notes, and altogether earnest, independent, and, to a student, delightful,—careless of everything but just the particular that was to be noted at the moment. Among the sketches are some of the studies of Italian diaper ornaments for the book Mr. Vacher lately brought out, and a sketch for the decoration of the pulpit of St. Margaret's Church, Westminster, which was done under his direction; also some patterns of wall-papers, made by Messrs. Jeffrey from Mr. Vacher's designs.

The sketches and studies of Mr. Gerald Horsley, who takes the second place in the competition and a special prize, are such a treat to look at as one has not had since Mr. Barrett competed for the Pugin Studentship two years ago. It is difficult to imagine a more perfect pen-and-ink sketch than that of the head of Augustus, or more beautiful pencil work than is shown in the drawings of the two Sibyls, and of the ambone from St. Miniato at Florence, and again in the almost comical carving of "Pharaoh" from the stalls at Amiens. The magnificent study of a portion of the celebrated retable in Westminster Abbey, and the delicate drawing of a spray of red lilies, are enough to make most respectably good draughtsmen emigrate without delay. Mr. Horsley is also doing some practical work in the way of colour decoration, as witness the cartoons of some lunettes for the roof of Netley Church which are exhibited.

The studies of Mr. H. Wilson, submitted for this same prize, show very careful work, and an accurate colour-sense. They all seem to have been collected in London from pictures in the National Gallery and the exhibits at

South Kensington, supplemented by capital original designs.

Mr. Briggs has some very good and useful sketches from Pompeii.

The chief competitors for the Pugin Studentship exhibit work well up to the high average of excellence always now attained. Mr. Thomas Maclaren takes the studentship with what is certainly the best collection; many of his drawings and sketches are old acquaintances, some of which have taken other prizes, and many have already been illustrated in our pages, among which latter may be mentioned the design for "A Town Mansion," and a drawing of a bit of foliage from Melrose Abbey, which is quite the best of the pencil work there. The sketch of the great window of St. George's Chapel, at Windsor, has not been improved since we saw it last by the slight tinting that has been added. We think, too, that the very fine sketch of the tower of St. Mary's, Oxford, suffers from the crude greens of the shrubs at its base. The drawing of the pulpit at Siena Cathedral is a magnificent pencil study, but the best and most useful piece of work is the sheet containing the shaded and tinted elevation and details of the library door of the same building.

Mr. Arnold B. Mitchell's sketches are clever, ambitious, and plucky, and the system he has adopted of pencil drawings washed with a pencil-coloured tint, is probably a very rapid way of getting an effect which is certainly worth getting; but we cannot help feeling that the sketches are a trifle hard, and that too much time has been spent upon subjects that would be telling, and too little on real study. The best sketches are those of a sword-hilt in the Bargello at Florence, and a bright little general view of Siena.

Mr. E. H. Selby, who shares with Mr. Mitchell the honour of receiving medals of merit, has done some good work, of which some sketches of the marble paving of Siena Cathedral are probably the best, — Siena Cathedral figures unusually but deservedly frequently in this exhibition.

Mr. R. W. Paul, certificate of honour, shows work which tells of a rapid hand and practised eye, and which falls little behind that of more successful competitors in effective finish; his measured drawings of the tomb of William de la Marchia, Wells Cathedral, are particularly good. Mr. Frank Simon must have run the two last-named competitors rather close for their honours; his work is very artistic and good, and although the soft pencil and rougher paper he uses are not adapted to very delicate drawings, his sense of light and shade and his accuracy are notable.

Of the design prizes, the Tite Prize has this year brought out the best work and the largest number of competitors. The subject was "A Classical Church on an isolated Site." The design of Mr. Frank W. Simon, which takes the prize, shows a very considerable mastery of Classical planning and design; it is correct in style and very effective in its monumental, lofty, and graceful proportions and refined detail; the drawing, too, is delicate and pretty, and worthy of the design. Mr. John Keppie's design, which is placed second, shows great restraint and some originality in the treatment of the plan and elevations, and its weaknesses only become apparent in the perspective drawing, which shows the almost ugly effect of the irregular octagon dome and the quite ugly effect of the little towers at the west end. The detail is good and the style evidently familiar to the designer to some extent, but he probably omitted to try his effects in perspective until too late. Mr. W. Stirling, whose design is placed third, cannot be accused of being hum-drum or commonplace. Not content with a design in the freest of free Classic styles, such as is seen in some of the terra-cotta work of North Italy,—the west front of the Certosa at Pavia, for instance,—a design as bizarre as it is original and, in many respects, clever,—he has added the daring experiment of making his drawings in bright red. As a design seriously considered, though it looks reasonably well in elevation, it can, after all, only be put down as more than moderately successful if intended to be executed in terra-cotta, when the extravagance of the carving and ornaments would serve to hide the imperfect joints. Of the other designs, that of "Unity" appears to us the best. It is severe, well proportioned, and appropriately decorated, but the drawing, at any rate where the figure is introduced, leaves something to be desired. "Lux" has made a reasonably successful study of Wren's London churches. He justifies his motto by introducing the very unclassical feature of coupled windows in the clearstory, thus flooding the interior with a rather unnecessary amount of "lux." "Fiat Lux" has introduced the novel arrangement of nave columns which support transverse arches instead of a longitudinal wall, so that the roof spans the whole width of the church, an arrangement which might lead to some novel artistic effects, and perhaps be less extravagant than it appears at first.

The competition for the Soane Medallion this year falls far behind that for the Tite prize, both in the number of competitors and in the excellence of most of their work. The medallion has been awarded to a careful study in that style to which it is difficult to give a name, since people have ceased to consider "Queen Anne" appropriate to any erection in red brick. Jacobean might describe most of its features, but will not do for all. Nr. Norman Shaw's building at the corner of St. James's-street is the very evident prototype of Mr. Francis E. Masey's study, and he certainly could not have chosen a finer design on which to work. His ranges of windows are effective, and so are the open arcades, but the turrets are too small in scale for effect, and the ingenious arrangement of entrances is very awkward. The plan is well balanced and convenient on the whole, but the corridors would be very dark. Mr. A. Whitehead, who takes second place, has a somewhat similar plan, but the corridors are better lighted, and the entrances are more convenient. The style is Classical, but the grouping is more adapted to a larger building and results in a too broken effect. The design would decidedly gain by the omission of the central turret and some of the spikes and urns with which it is ornamented. We should like to comment upon the design "Usui Civium," which we consider is architecturally a finer study than any of the premiated work in this competition, but space fails us.

Of the three competitors for the Grissell Medal, Mr. Strong has fully earned his success by his careful calculations and adjustment of stresses, but if the scientific construction of a roof of 60 ft. span of wood necessitates so many joints and such a forest of timbers, we hope every such roof will, in future, be built of iron.

The competition for the Silver Medal has not collected quite so much good work as usual lately. Mr. James H. Cooke, who receives the medal for his drawings of Stokesay Castle, is evidently a practised draughtsman, and his drawings are only less beautiful than those of Mr. Frank Bellis, of Haddon Hall, who comes second, and only lost the first place, as was explained to the meeting on Monday, by omitting to measure some of the important stone jointing.

Mr. R. Elsey Smith has won the Essay Medal with a clearly-written account of the history of wall piers and buttresses, prefaced by an introduction dealing with the scientific theories connected with the subject, and accompanied by a portfolio of photographs and sketches illustrating it.

It was announced on Monday evening by the Hon. Secretary of the Institute that, in future, drawings which had obtained for their authors the Gold Medal of the Royal Academy or the Soane Medallion, or which had been executed by students during the compulsory tours connected with those prizes, would in future be excluded from consideration in making the award of the Pugin Travelling Studentship.

Nineteenth Century Art Society. — Wednesday, the 26th inst., has been appointed for the reception of works of art intended for the Spring Exhibition of this Society, at the Conduit-street Galleries.

ARCHITECTURE BY ADMINISTRATION.

THE architect is gradually assuming a new character. Long ago he ceased to be either a painter or a sculptor. Now he is in danger of altogether abrogating his claim to be considered an artist. He is becoming an administrator,—the director of other people's faculties,—and no more.

This change is partly due to the general movement in the world around us. But it is also due in part to an indolent yielding to unworthy solicitations. A modern building,—like a modern war vessel,—is a complex thing, and in proportion to its complexity the difficulty of designing and adjusting its multitudinous parts by a single mind increases. The advice of specialists in certain departments must be sought, and may be honourably obtained. No one will, for example, expect an architect to devise in detail a scheme of electric lighting. He must rely upon the aid of the electrical engineer, who should have due credit for his work. The architect must be content to receive directions for the necessary structural provision and preparation, and limit his share in the matter to the design of the visible fittings.

But this and similar necessities of modern practice have brought up a crowd of importunate advisers, who would (and do) encroach upon the architect's peculiar province,—who will, in the expectation of supplying their manufactures, relieve him of his proper duties, calculate the strength of his girders and stanchions, and draw for him in elaborate detail the constructive portions of his works. The smith will suggest (to ½-in. scale) ornamental ironwork; the plasterer will draw his strap-work and floral adjuncts, and only asks to have a diagram of the ceiling spaces to be filled, or even the size of the room; the firm who supplies the tiles or mosaic has a staff of young men who do nothing but provide "architects" with designs, and so on. From this prevailing condition of things two considerations arise.

First, that architecture so conducted degenerates into a mere manufacture. Buildings which are the reputed work of Mr. A. share with Mr. B.'s and Mr. C.'s certain characteristics, which are finally traced to Messrs. X. & Co. And the conclusion sooner or later is brought home to the public mind that A. and B. and C. are all impostors, using for their own emoluments and self-glorification the various artistic abilities of other people.

The second consideration is, that architecture by administration can be undertaken by administrators who are not even in name architects. Let our younger men look to it. Architecture is now sold at "the stores," and takes its place amongst other commodities dispensed by the universal provider.

This is a point which should be pressed upon young architects, who should be exhorted to design (in their own proper persons) everything that is ascribed to them.

It is possible that no one man will be able to design in all departments so well as he who restricts his attention to one. But there will be an ample compensation in the fact that a building designed throughout by one and the same person will be an original work, complete and congruous, and bearing the impress of a single mind.

Architecture so followed is an art. Pursued by the method to which we have alluded, and which threatens to become popular, it is a mere business, not of the most honourable kind, for it robs the actual designer of his credit, and gives honour where it is not due.

NOTES.

THERE seems to be a chance of finding a site for the re-edification of Temple Bar at last, and one that is eminently suitable for it, as was pointed out in the columns of the *Builder* nearly two years ago. According to the *Standard* of Monday last, the occupants of chambers on the south side and north side of Nos. 6 and 7, King's Bench Walk, Temple, respectively, have received notice from the

Benchers of the Inner Temple to give up their chambers in March. "The reason for this is that the outer walls of both these buildings, which are some of the oldest in the Temple, have been condemned as unsafe, and will consequently be pulled down. Advantage will at the same time be taken of this opportunity to widen the Whitefriars entrance to the Temple, which is at present inconveniently narrow, and a new and handsome gate will, it is said, replace the ancient wooden structure at present in use. It is expected that the alterations will be completed by October next." If the *Standard* had said "ramshackle" in lieu of "ancient" as the descriptive adjective of the existing gate, it would have been nearer the mark. It is an ordinary piece of joinery, and is probably not fifty years old. However, that by the way. There can be no doubt that this is *the* site for the re-erection of the old City gateway. It is within the City itself; the gateway would necessarily have to be put up with its eastern and western *façades* in the same relative positions as they formerly occupied, thus preserving the "orientation," so to speak; it would form a fine and appropriate entrance to the Temple from Whitefriars; and it would be well seen from New Bridge-street as the termination of the long *vista* westwards along Tudor-street and Temple-street, now widened for almost the entire length, one or two jutting buildings only remaining *in situ* temporarily, pending the development of the building estate on the Embankment. Re-erected on this site the "Bar" would remain identified in name as well as in fact with the Temple and its associations, while it would form an important architectural addition to this rapidly-improving part of the City, being in close vicinity to the civic and public buildings already erected and likely to be erected on the Embankment land. The new approaches to the Embankment from Fleet-street in continuation of Bouverie-street, Whitefriars-street, and Dorset-street are likely to do much for this hitherto somewhat benighted part of the City. We notice that Mr. James C. Powell, of the Whitefriars Glass Works, writes to the *Standard* unconsciously adopting and recommending the site which was proposed in our columns two years ago for the re-erection of the "Bar," if the stones "be still in existence." We believe they are, but we are not sure that they have been very tenderly cared for by their natural custodians, the Corporation of London.

THE meeting in furtherance of the French Railway Jubilee, held at the Cannon-street Hotel on Tuesday, left no doubt that the proposed International Railway Exhibition this year in Paris is likely to be conducted in such a way as to be a success, and that English engineers and railway authorities have done well to join hands with the French in furthering its success. It is unnecessary, however, for newspaper writers on the subject to take the complimentary tone some of them do, as to our possibly having a good deal to learn from the French as to railway work. We are behindhand in the matter of comfortable and roomy railway-carriages, though this defect has been a good deal made up lately; but in the matter of railway working, speed, and efficiency, our best railways are, we believe, at the head of the world; and there is no occasion for any unnecessary humility on this topic, at all events.

WITH a promptitude which deserves all praise, the *Railway Age* publishes full statistics of the mileage of new railways constructed in the United States during the year only just closed. We learn from the figures given, that 8,010 miles of new lines (reckoning main track only) were built in 1886, against 3,131 miles constructed in 1885, 3,825 miles in 1884, 6,741 miles in 1883, 11,568 miles in 1882, and 9,796 miles in 1881. The two last years showed the greatest activity in railway construction of any former year; but 1886 runs 1881 pretty closely, whilst 1871 (with 7,379 miles) follows close upon last year. Kansas leads the way with 1,520 miles, the greater portion of which was laid during the last six months of the year. Nebraska comes next with 737 miles, and then follows Dakota with 678 miles, Minnesota with 587 miles, and Texas with 543 miles. The five States named make up a total of 4,065 miles of new railway, or more than half the mileage constructed in 1886. Assuming the average per mile of roadway to have been 20,000 dols. per mile, we obtain an annual expenditure for permanent way of 160,000,000 dols., or over thirty-two million pounds sterling; and to this must be added the capital spent in rolling stock and equipment.

THE recent case of Simmons *v.* Kinsrinki, which was an action for an infringement of the light to the plaintiff's buildings, and in which the jury found a verdict for the defendant, settled no legal point. It is certainly noteworthy, however, in one sense, for we are informed by the report of the trial that "scientific and other evidence was called in support of the plaintiff's case." Likewise, we are told that Mr. Joseph, an architect, and other expert witnesses, were examined on behalf of the defendant. The question for decision was whether there had been a substantial diminution of the light to the plaintiff's building. It is not to the credit of the profession of architects and surveyors that a number of gentlemen can be found to give diametrically opposite opinions upon a question as to which there should be very little doubt. It is natural that professional men should differ on the value of property, for this is a matter of comparative uncertainty. But a person of ordinary vision should be able to say whether a room is substantially deprived of light by a neighbouring building. We fear that the case shows that Professor Kerr's admirable work on the Consulting Architect requires wide and careful perusal.

THE undoubted success,—so far as it has gone,—of the new Agricultural Hall at Kensington makes it incumbent on the management to take care that visitors run no dangerous risks. But the staircases which lead to the gallery, with which the grand circle and some other parts of the building are in communication, appear likely to cause risk to limb, if not to life, in case of a panic. They are tortuous, and not very large,—large enough, perhaps, for the needs of an ordinary theatre, but insufficient for the vast numbers who visit Olympia, and have to use them. Even after an ordinary evening performance the crush is extreme, and were a panic to arise the result might be very serious. Staircases in such a place as this hall should be broad and as straight as possible, or else so numerous, if not of large size, that a full house may be able to be emptied with rapidity and with ease through a number of different exits.

A SAFE method of blasting (if the term can be correctly applied in this instance) in fiery mines has been suggested by Dr. Kosman. The system is described in a paper recently read by the inventor. It consists of bringing dilute sulphuric acid into contact with a fine zinc powder. A cartridge case of glass, 7 in. long and 1 in. in diameter, is divided into two parts, the volumes of the two divisions being as 1 to 4. The division is made by reducing the diameter of the glass cylindrical case to about one-third of an inch, and inserting a plug of cork, indiarubber, or asbestos. The larger division, which is closed at the bottom, having been filled with the dilute sulphuric acid, the cartridge is distributed to the miner for use. When the operator wishes to apply the cartridge he fills the smaller part of the glass cylinder with the zinc dust, and then forces a small metal rod through the zinc into the plug. In order to cause the cartridge to perform its work one or two smart blows are given to the metal rod or needle. This drives in the plug and breaks the glass, so that the acid runs into the part containing zinc-dust, and a rapid though not instantaneous evolution of hydrogen takes place, the expansive force being sufficient to break down the rock. The shot-hole is loaded and tamped in the ordinary way, but should the rock be porous or jointed it will require to be clayed to prevent the escape of gas. Dr. Kosman gives the following particulars of working. A cartridge, 25 millimètres in diameter and 180 millimètres long,—about 90 cubic centimètres,—will contain 50 cubic centimètres of sulphuric acid and 12 grains of zinc dust, or 10 grains of metallic zinc. The latter will liberate 0·3 grains of hydrogen, or, by volume, 3·37 cubic mètres. This volume of gas being confined to 90 cubic centimètres the resulting pressure will be approximately 37,000 atmospheres. The evolution of hydrogen is not thought to add to the danger owing to the rapid diffusion of that gas in atmospheric air. Particulars of the system may be found in the eighty-seventh volume of the "Transactions of the Institution of Civil Engineers," p. 41.

A FEW weeks ago we drew attention to Mr. Shilleto's translation of Pausanias; a book has since appeared, by Dr. Kalkmann, a "Privat docent" of the University of Berlin, which no student of Pausanias, even through the medium of a translation, can afford to neglect. In his "Pausanias der Periëget,"* Dr. Kalkmann gives us a series of most interesting essays on the "sources" of Pausanias. Some of us are so used to regarding Pausanias as in himself the most final of "sources," that we may feel a little aggrieved to have to push our inquiries further back. It would not be easy, however, to over-estimate the importance of the line of inquiry that Dr. Kalkmann opens up. He himself regards his book as merely "path opening" (*bahn brechende*), but the "path" is one that every commentator is henceforth bound to follow. If Pausanias is to be used as evidence, we must convince ourselves that he is a credible witness,—that he is not a historian of the type that Lucian describes, who, "though he had never set foot outside Corinth or seen a battle, not so much as a painted fresco, yet begins his history of the Parthian war with the words, 'Ears are less trustworthy than eyes; I write, therefore, what I have seen, not what I have heard'; and goes on to narrate how, 'from his seat in a high tree, he saw the Parthians hurling snakes from long poles against the enemy.'" How far Pausanias stands convicted of this, at that time, fashionable sort of mystification we leave it to Dr. Kalkmann to tell.

WITH reference to our remarks in the *Builder* for the 8th inst. (p. 77) with regard to the lion of St. Mark, Signor Boni writes in explanation that the framework of the lion was erected in 1815 to support the figure which returned from Paris in fragments, and that the iron nuts have in some places cracked the bronze plates of which the figure is composed. Signor Boni says that he has been accused by his countrymen of wishing to preserve monumental antiquities beyond the bounds of possibility, and that he feels no remorse in suggesting the substitution of a framework of copper for the present iron framing. He further explains that he does not propose to restore any missing portions of the figure, but only to modify or suppress such features as were added in 1815, and which falsify the symbolical value of the lion or alter its character. He proposes to remove the book between the lion's paws, which is of lead and dates from 1815; to take out the eyes, which were added in 1815 and are of white glass, and make the lion appear blind, and to replace them by crystal of an amber or ruby colour. The wings were, it appears, also the work of the year 1815, and are entirely different from the original design. Signor Boni acknowledges that it will be impossible to restore the original wings, all trace of them having been lost, but thinks it is possible to give the new wings a shape which will harmonise with the lines of the antique bronze; but how he proposes to carry this out he does not state. The capital of the column he proposes to retain in its present state, only substituting copper cramps for the present iron cramps.

---

* Pausanias der Periëget. Untersuchungen über Seine Schriftstellerei und Seine Quellen. Von Dr. A. Kalkmann. Berlin: Reimer. 1886.

DR. SALOMON REINACH has done good service to archæology by the issue, in popular form, of his advice ("Conseils"*) to intending student travellers in Greece and Asia Minor. A noted epigraphist himself, his advice is primarily offered to inscription collectors, but much of it would well apply to the whole field of archæology. His most important piece of counsel is, "Be well prepared before you start," and in the clearest and simplest way he details the essentials of mental equipment. Know precisely *what is already known* in the country you intend to visit, and thus avoid the waste of time involved in collecting materials already published. Dr. Reinach proceeds to explain carefully how a squeeze is taken, and to give directions for the sort of photograph that is desirable. He even gives hints as to the method of taking a topographical sketch. His book is thoroughly practical, and its *principles* applicable far beyond the limits of epigraphy. It is for want of some such advice as this that so little is done for science by the average educated traveller.

WE are very glad to find that at the Manchester Jubilee Exhibition an important place is to be given to original artistic work in "artisans' and women's industries." The Executive Committee have granted a sum of money to be spent in awards for the best original work in furniture, wall paper, carpet and calico designs, wrought-iron, wood carving, modelling in clay and terra cotta, brass-work, and embroidery. This should form a most interesting feature of the proposed exhibition.

SIGNOR RAGGI'S statue of General Sir Arthur Kennedy, the late Governor of Hong Kong, which has been temporarily placed on the open ground opposite Shaftesbury Avenue, is said by the General's friends to be a very good likeness, and has at all events that individuality of expression which a good portrait likeness generally shows. The head is finely modelled. As to the rest of the statue, what can be made of military uniform in sculpture? It is better in bronze than in marble: that is all that can be said. It would be a great boon if any method were adopted of putting up memorial likenesses of eminent men in such a form as to get rid of the insuperable modern costume difficulty; say by treating them as a bust on the head of a "term," the shaft or plinth of which might be ornamented with small decorative bas-reliefs having some symbolical or historical reference to the subject of the monument. Nothing, we fear, will ever get over the artistic unsuitability of modern costume, military costume especially, for sculpturesque treatment. The statue has been cast by Messrs. Young & Co., at the Eccleston Iron Works, and appears to be a very good piece of founder's work. It is ultimately to be erected at Hong Kong.

THE exhibition of landscapes in oil and water-colour, by Mr. MacWhirter, in illustration of "the land of Scott and Burns," now on view at the galleries of the Fine Art Society, in New Bond-street, is of much interest topographically, and includes some very effective works in the artist's broad though rather mannered style. Among others is a fine view of Neidpath Castle, recently referred to in our review of a work on Scottish Castellated Architecture. The scenes into which architecture comes, the views of Ayr and Dumfries, &c., are among the best of the series, and appear to combine topographical accuracy with artistic effect in a very well-balanced manner.

THE Metropolitan Board of Works have received forty-three applications for the post of Superintending Architect in response to their recent advertisement, eighteen of which are from architects or surveyors who applied before. Among the best known of those who previously applied, and who now apply for the second time, may be mentioned Mr. J. Douglass Mathews, Mr. E. J. Tarver, Mr. R. Walker, and Mr. W. Woodward. Among the new applicants are Mr. T. Blashill, Mr. G. Corson, of Leeds, Mr. John Hebb, and Mr. A. Peebles. At the meeting of the Board on the 14th, it was moved and carried that the applications be referred to the Works Committee, with instructions to select and submit to the Board the names of not more than six of the candidates whom they thought most suitable to the office. Some of the best of the new applicants would have been ineligible on account of the limitation of age under the former advertisement, and the result shows that the Board have done wisely in withdrawing this limitation.

* S. Reinach. "Conseils aux Voyageurs Archéologues en Grèce et dans l'Orient Hellénique" (Petite Bibliothèque d'Art et d'Archéologie). Paris, 1886. Leroux.

GOWER-STREET.

WERE it not for the new face which it has assumed within the past two years, Gower-street could claim to rank as one of the dullest, gloomiest thoroughfares in town. Within the memory of, doubtless, most of our readers it fully answered to the phrase which the Laureate applied, it is generally believed, to Harley-street.* Looking at the then depressing vista of its blackened house-fronts, their monotonous elevations wholly unbroken or unrelieved, we have difficulty in realising the fact that less than sixty years ago the street was so free from smoke that grapes and wall-fruit would ripen in the open-air sun in the gardens at the rear. Lord Eldon once lived (1804–1815), being one of its earliest inhabitants, in Bedford-square, at the southern end of Gower-street. There is record that in the course of a case in court he took occasion to mention how the ever-increasing encroachment of London smoke had injured his fruit trees; just as Archbishop Howley, at Lambeth, found that his beloved garden was ruined by the kilns of the neighbouring pottery works.

An inspection of certain maps goes to show that Gower-street was planned, if not indeed inhabited, before the beginning of this century. As "Gore-street"† at the lower end (in a map of 1799), it runs as far north as Pancras-street. But all the ground eastwards, and north of Montague House (British Museum) and Bedford House is shown as open fields with a diagonal hedgeway from Baltimore House (Russell-square) to Totten Hall. Again, from Baltimore House to the Brill (Somers Town) is marked "The Duke of Bedford's New Road." This for part of its length corresponds with the later Woburn-place. Between these two roads lies an enclosure — the Archery Ground, almost identical with what is now the site of Tavistock-square. Here the Toxophilite Society (a remnant of the old Finsbury Archers, 1781), established themselves in 1791 under a term of a lease granted by the Duke of Bedford. They remained until 1805, when they were compelled to retreat before a foe against whom their artillery could avail nothing to Highbury Barn. Hence they removed to Bayswater, and ultimately, in 1834, to their new quarters in Inner Circle, Regent's Park.

The open area, of which we speak, was originally known as Long, and latterly as Southampton, Fields. It had been renowned in the seventeenth century, as Macaulay reminds us in his famous Chapter III., for peaches and snipes. It speedily acquired repute of a very diverse character. For there, according to a legend of the period illustrated by Macaulay, was fought that duel between two brothers which gave the name of the Field of Forty Footsteps to the place of their deadly encounter.‡ Far into the eighteenth century Southampton-fields formed a favourite duelling-ground, and on Sundays were rendered hideous by the resort of patrons of the ring, with all the rascaldom that followed in their train.

Gower-street takes its name evidently from the second wife of John, fourth Duke and eighth Earl of Bedford, who married Gertrude, eldest daughter of John, first Earl Gower. So plainly, indeed, has the genealogical history of the Russells been written in the nomenclature of the numerous thoroughfares with which Gower-street communicates, that it were worth while to illustrate under what circumstances these names* were adopted. In traversing Gower-street we pass from the Bedford to the Grafton estates, being two of the great ducal properties whose undivided existence forms a striking feature in the cadastral history of London. The district that is commonly called Bloomsbury was known to Stow as Lomsbery, a corruption probably of Blemunds, or Bleomunds, Bury. This and St. Giles were later sub-manors of the ancient manor of Ruggemere, which "in Domesday is described as a manor in Ossulston [hundred], belonging to Ralph, a canon of St. Paul's. It was assessed for two hides. It was worth thirty-five shillings (a year) . . . . It was then, and had been, in the demesne of the canons of St. Paul's."† The name of Rugmere yet attaches to a prebendal stall at St. Paul's. The mere lay in the slightly rising ground between Tyburn and Holborn. Its draining by a ditch or dyke is generally ascribed to one William Blemund, *temp.* John, and the course of his fosse should perhaps be identified with the bend of High and Broad streets, St. Giles, and the western end of High Holborn, which formed the highway before New Oxford-street was laid out. Some say that the manor-house stood where is now Bedford-place. We cannot here follow the history further back than to say that in the early part of the seventeenth century Henry Wriothesley, Earl of Southampton, bought the sub-manor for 600*l.*, his town-house being then in High Holborn, just west of the Bars. This was pulled down before 1657 (*teste* Howell). After the Restoration, Thomas, fourth Earl of Southampton, Lord Treasurer, built Bedford or Southampton House on what is now the northern side of Bloomsbury-square. Evelyn refers, under date 9th of February, 1665, to "a noble square or piazza, a little town," which his lordship was then building in Blomesbury. Macaulay, too, on the authority of the Travels of the Grand Duke Cosmo, writes:—"Foreign princes were carried to see Bloomsbury-square, as one of the wonders of England."‡ Much of the eastern side, *olim* Seymour-row, is modern, and harmonises but ill with the others. Southampton House, eventually demolished in 1800, passed, together with the estate, to the Russells, on the marriage of Lady Rachel, *née* Wriothesley, second daughter and eventually heir of Thomas, fourth Earl of Southampton, to William Lord Russell (so often but erroneously called Lord William Russell), who, in Burnet's words, triumphed over death in Lincoln's Inn-fields on 21st July, 1683. Viscountess Russell was widow to Francis, Lord Vaughan, son of the Earl of Carbery. She died here in 1723. Their son succeeded 7th September, 1700, to his grandfather (who had been advanced Marquess of Tavistock and Duke of Bedford, 11th May, 1694) as second duke. In pursuance of our scheme, we should state that several members of the family were named Francis, and that Francis, second Lord Russell of Thornhaugh,§ inherited, 3rd of May, 1627, as fourth Earl of Bedford. The great John Russell of Henry VIII.'s day was elevated, 9th of March, 1539, Lord Russell of Cheneys, co. Buckingham, and obtained grants of Tavistock Abbey and Woburn Monastery, co. Bedford. He was advanced Earl of Bedford, 9th of January, 1550. Wriothesley, the second duke, had married 1695, Elizabeth, daughter and co-heir to John Holland of Streatham, and, acquiring a considerable fortune by that union, was created, 13th of June, 1695, Baron Howland of Streatham, co. Surrey.‖ His nephew John, who succeeded, 23rd of October, 1742, as fourth duke, married, 11th of October, 1731, Diana, youngest daughter of Charles, Earl of Sunderland; and in 1737, Gertrude, eldest daughter of John, first Earl Gower. Francis, the son by this second marriage, married Lady Elizabeth Keppel, daughter of William, second Earl of

* "The long unlovely street."—*In Memoriam.*

† This spelling in the old map, we may observe, is proof positive (if any were needed) of the incorrectness of the common Cockney pronunciation of the name of the street, with the same sound for the "ow" as in "how," "cow," &c. The old family name after which the street is called is a one-syllable word, pronounced *Gore*, as written in the 1799 map referred to.

‡ Usually fixed in what is now the space between Woburn and Russell squares. But the bearings given by Southey in his "Commonplace Book" correspond with the now Drummond-crescent and the adjacent end of Drummond-street, beyond Euston-road. Moser, under date 16 June, 1800, says he saw that field just before it was destroyed for building purposes.

* Compare with the local and personal names given in the text; one or two of the street names have been altered.

† The Rev. W. J. Loftie's "History of London." Edit. 1884.

‡ History of England, cap. iii.

§ Hence, Thornhaugh-mews. Thornhaugh-street is now Huntley-street.

‖ Howland-street was the early home of the late Serjeant Ballantine.

Albemarle, and left issue Francis * and John, who succeeded in turn to the dukedom. John, sixth duke, married 21st of March, 1786, Georgiana Byng, second daughter of George, fourth Viscount Torrington; and for his second wife, on the 23rd of June, 1806, Georgiana, daughter of Alexander, fourth duke of Gordon.

So much of Gower-street as extends northwards of Francis-street was at one time known as Upper Gower-street and Gower-street North. At No. 15, Upper Gower-street lived and died (1834) a celebrated antiquary, Francis Douce. No. 65 Gower-street was the last London home of Jack Bannister, the actor, who in wit and simplicity seems to have been a second Gay. The house at the corner of Montague-place and Gower-street was used as a laboratory and repository by the singular recluse, Henry Cavendish. He devoted all his time to chemical experiments and research, being rarely seen out of doors except when going to or from Dean-street, Soho, where he kept his books, and would lodge a receipt for each volume he abstracted. An intimate of Banks and Davy, he was seldom known to entertain visitors, and even when he did, no other dish than a leg of mutton, one or more, ever suggested itself to him. In this house he died in 1810. At the northern end of Gower-street, where the road is blocked by one of the many barriers that still impede the traffic, are University College and the North London or University College Hospital. The latter was founded soon after the opening of the College, under Lord Brougham's presidency, and built after Alfred Ainger's design. The foundation of the College is generally attributed to Lord Brougham,—a scientific man amongst lawyers and a lawyer amongst scientific men,—though the exertions of Campbell, the poet, to the same end should not be forgotten. Its design,† by W. Wilkins, favourably compares with his later National Gallery in Trafalgar-square. The first stone was laid on Monday, April 30th, 1827, by the Duke of Sussex, under strong Whig auspices. The central portico, raised upon a lofty plinth and approached by flights of steps, has a fine effect.

The hall beneath the cupola constitutes a befitting resting-place for a priceless possession,—the original models of John Flaxman's chief works, which about ten years after his death were presented to the council by his sister-in-law, Miss Denman. Of these, as well as the not less interesting collection of Flaxman's sketches, we gave a full description some time ago.

The relaying of the roadway of Gower-street in recent times, partly with asphalte and partly with wood-paving, probably in an almost literal sense "paved the way" for the improvement and resuscitation of the street. In its former condition, with cobble paving of even unusually severe type, the rattle of vehicles was formidable, and, with the present development of traffic, the houses, had the old pavement remained, would have been almost uninhabitable for any sensitively-organised tenants. Following on this necessary alteration, great improvements were made some little time since in a number of the houses on the west side of the street, in regard to sanitary arrangements and additions necessary for modern ideas of comfort and decent living. The attempt made at the same time to give a more important appearance to the front of a good many of these houses, by framing the doorways with stone pilasters and architraves, has not been so successful; the additions thus made being, architecturally speaking, as ugly and badly-designed as they could well be; it would have cost no more to have made them agreeable and picturesque, had they been put into proper hands. Very recently some of the larger houses on the east side of the street have been taken in hand, and subjected to a thorough refitting internally, without any similar attempt at stone-casing the entrances, which, if it were to be done no better than on the west side, is certainly better let alone. These more lately "revived" houses are excellent residences of their class, with a good deal of pleasing variety in the arrangement and planning of the principal rooms, and they have another attraction little suspected by the casual passer-by; for few who look at the long monotonous line of houses on this side of the street, would expect to find in their rear quite a plantation of trees, some of them very fine ones. In the building alterations recently made, we are informed, the most religious care has been taken not in any way to injure these trees, which are a precious possession to the site.

* *Vide* his statue, by Westmacott, in Russell-square.

† The northern wing was recently added, under the superintendence of Professor Hayter Lewis; but the buildings are yet uncompleted.

A CLUSTER OF DECORATIVE ARTISTS.

BIRKENHULTZ—CARRAVAGGIO—FOLKEMA—PHILIP GALLE—JACQUINET—WENZEL JAMITZER—JANSSENS—PITTONI—VALCK—VISSCHER—WOERIOT.

WE must commence by saying that the cluster of decorative artists whose work we propose to consider to-day, and whose names stand at the head of this article, are so grouped merely for our own convenience. They have no common country, no common period of work, and they produced designs which have nothing in common but, perhaps, excellence. We have lingered somewhat longer than we had intended over the work of the five artists we have specially considered, and for various reasons we propose now to make a wide cast of our net. In some instances there are but few specimens of their work preserved,—at least, in the British Museum Collection. In some instances there is a good deal of very inferior work, relieved only at rare intervals by flashes of genius; and in others, again, there is an abundance of work, but little variety of style. We have, therefore, arranged their names in alphabetical order, and with our readers' permission will take them as they come.

Fig. 1.

Of Paulus Birkenhultz little is known save that he was at work in Germany about the year 1670. He worked like so many others for the jewellers, but his designs have mostly little merit. There is, however, one little panel in the midst of the pendants which cannot be passed over (fig. 1). To those who love the Renaissance and all its works without discrimination, the flapping of the bird's wings in the centre will seem a pretty incident; to those whose admiration is somewhat qualified and disturbed by such presence it must seem a blot on the scutcheon. But on this subject we have already spoken at sufficient length, and it will be unnecessary again to recur to it. "Barrin' the bird," however, the design is specially graceful, the main stem of the scroll splitting up the panel into six not too uniform subdivisions very pleasantly.

Fig. 2.

From Birkenhultz we go back more than two hundred and fifty years to Polidoro Caldara da Carravaggio, who was born in 1495. He was a disciple of Raffaelle, and painted the friezes accompanying his master's work in the Vatican. His engraved decorative work consists of a large series of designs for silver cups, which are remarkable for exquisite purity of form, and for the perfection of simplicity in the ornament put on them. One of these we will give an illustration of in our next.

The next name on our list, R. J. Folkema, probably worked at about the same time as Birkenhultz, or possibly even later. His work strikes one at first sight as mediocre, chiefly on account of a certain lack of fineness in engraving and a want of freedom and firmness in the drawing of the curves; but it is not without merit. We should hardly, however, be justified in ranking him as a master of the art, but rather as a successful student. The want of freedom in his drawing suggests that a good deal of his detail was copied and applied rather than inspired, and the result is often ungainly: in one or two places he is, however, more successful. In fig. 2 we give the main structural lines of a really charming acanthus study, and in fig. 3 a more finished sketch of a fragment of the foliage, which, in spite of one or two obvious defects, is still not without a considerable amount of graceful feeling.

In the same rank with Folkema, we must (departing for the moment from our alphabetical arrangement) place Gerard Valck. He also seems to have been a not altogether unsuccessful student; but whereas Folkema mastered the art of construction of design, but lacked something of originality in his detail, Valck seems to have been quite successful in foliage detail, but to have missed the mark entirely with regard to general construction; fig. 4 is almost repulsive, with its uncouth and ungainly structural lines, but the acanthus-leaves are exceedingly well drawn and adapted to the places and purposes in and to which they are put.

Philip Galle is an artist of a very different order of merit. He was born at Haarlem in 1537, and afterwards became a printseller at Antwerp. His name will not be entirely unknown to our readers, for some at least of his

Fig. 3.

Renaissance panels have been reproduced and serve as head or tail pieces in the illustrated magazines of the present day. But it speaks ill of the taste of those in whose hands the selection of designs for such objects rests, that they should have deliberately given prominence to Galle's worst work, and have passed by his best unheeded. For he worked in two very distinct styles. Although there is little to find fault with in the execution of his Renaissance panels, in design they are but a heterogeneous mass of ill-assorted and often unpleasing detail. But his best ornamental work is of a very different calibre, and it is difficult to realise that such good and such bad work can have come from the same hand. Of this second style we give an example in fig. 5; in it every canon of the art is observed with the greatest fidelity. First as to its main structure. The curves are given off from the points above and below the little central medallion which does not enter into the design: from these points they flow with absolute freedom, adapting their volution without constraint to the form of the ellipse which has to carry them. There is not one inharmonious break or jar in their tangential flow. The longer scrolls from the bottom wind up to the right hand and the left, and meeting the shorter one from the top intertwine with them, and then fall back again; but there is no confusion, each has its own allotted space to fill, and each in due course fulfils the object for which it was created. And as the main structure is perfect in its way, so also is the detail in its way. The foliage is a very simple conventional form, a leaf with but few serrations, and only here and

there a five or six petalled flower; but the whole surface is evenly covered, and there is no spot covered or uncovered which stands out above the rest with undue prominence.

From Folkema let us pass to one Jacquinet, a gunsmith, who ornamented the locks of the weapons he sold with pleasant devices. There is no extraordinary merit in them save one, but that one redeems every design he made from falling into commonplace: there is little compactness in their composition, the flowers are but slightly, if at all, conventionalised; there is not much originality in the detail, but,—and this is an important "but,"—the designs are in every instance perfectly adapted to the object they are intended to beautify. As in speech, action, its ornament, must be suited to the word; so in decoration the lines of which it is composed must be suited to the thing on which they are placed. It is Bourguet's "*ovales ronds et carrés*" principle over again;* for harmonious effect the construction of the ornament must follow the construction of the thing ornamented. It is, perhaps, difficult to find an object that lends itself less to continuous and homogeneous design than a gun-lock, with its flint and steel, its hammer and spring, its bolts and its screws; but Jacquinet took it as he found it, embellished every part as it came under his hand with loving care, and, as we have said, produced at least some designs very pleasant to behold. There are a goodly number of these gun-lock designs evidently coming from an illustrated catalogue, and every one will bear its own witness to the truth of what we say.

The elaborate candlestick given on the separate plate of illustrations in this number comes from the hand of Wenzel Jamitzer von Munich, sometimes called the Master of 1551. It is one of a considerable number of designs, most of which are for large and richly-embossed cups. It is difficult to decide to which to give the palm, the complicated outline or the elaborate detail which covers the surface. The latter can speak for itself, but the beauty of the outline demands some slight analysis. The beauty of an outline which is very much broken up depends on the beauty of the curve which is formed by joining the extremities of the most important of protuberances. Let us draw such a curve, starting from the topmost moulding, just underneath the pan which holds the candle-socket. It travels inwards past the second moulding till it reaches the little boss in the centre of the spheroid immediately below it; then it swells out, slightly touching the extremity of the wreath, touches the little bit of moulding which holds the little man's head (which with the claws are but slight excrescences); still gradually swelling outwards it glides by the moulding underneath the arches and figures, till, with bolder and bolder sweep, it passes the moulding beneath the medallions, and at length it meets the massive curves which form the base. We have drawn a beautiful curve. But why beautiful? We know not; perchance, by reason of its elaborate equation (which expression we might possibly, with some truth, hold to stand as the mathematical curve-tracing equivalent for the artistic suggestion of the infinite). But this we know, that one curve excels another curve in beauty; that an ellipse is more beautiful than a circle, a parabola than an ellipse, a hyperbola than a parabola, a catenary than all the others, and so on through all the mysteries of the tracing of curves to which no names can be given, so many legion are they. The bottom segment of the curve we have drawn has something of the spirit of a catenary about it; the upper segment runs into the lower at a perfect tangent to it, but is too short to indicate its ultimate destination. But the sum and substance of all this is that we hold it to be a line of great beauty, and the form of the candlestick which is modelled to it, to be a thing of beauty also.

Our next illustration, fig. 6, is a fragment from one of the designs of a Flemish artist, Hendrik Janssens. Very few of them seem to have been preserved, but there is a singular grace and freedom in the curves of the fragment we have selected which seems to have been designed for some species of gold work.

In Battista Pittoni, born at Vicenza in 1585, and Claes Jansz Visscher, who flourished about 1640, we have two masters who worked almost exclusively on the revived classical models. The former produced endless variations on the acanthus scroll; the latter in addition to similar studies published a bookful of designs of festoons and fruit. These are not sufficiently interesting for reproduction, but we have reproduced one of the scrolls, and two of Pittoni's. These are given in the separate plate of illustrations. It is needless again to enter upon the much-debated question of the artistic value and merit of this classical model; the genera structure of the scroll is a fixed quantity, the only scope for the artist's originality and individuality in the scroll itself being found in inventing new devices for the floral terminals and bud sockets; for the rest, the animals and children could be varied *ad libitum*, the designer's liberty in this respect being absolutely unfettered and unconfined. With the elaborate sword-handle, also in the separate plate, one of a series designed by Pierre Woeriot, we close this article: the flowing lines of the guard are especially beautiful, as is also the treatment of the acanthus-leaves on the stem.

In this little cluster of decorative artists we have gathered only those whose work might justly serve as examples of merit of one kind or another. Even from the British Museum collection, which is the only one of its kind in England, but which from the nature of the case must necessarily be very incomplete, we would willingly have culled specimens of other

Fig. 4.

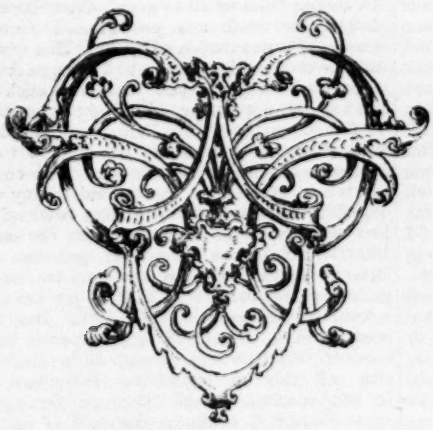


Fig. 6.

Fig. 5.

* See our article on Jean Bourguet, Jan. 1, 1887, p. 6.

masters; some of the many cups, for example, designed by Bernhard Zau, about 1571, or of those which Hanns Christoff Lœchlin von Leutkirch published in 1594 in his "Buch mit xxvii. Stück"; or of the weaker designs for the same purpose by their contemporary Johann Stephens (1582): some of the ornaments for "*arquebuserie*" from Pieter Schenck's collection, "*tirées des premiers maîtres de l'Europe*": some of Daniel Mignot's gold work; but our series of articles would be unending, and we have still much ground to traverse before they are concluded. One eminent name our readers will have assuredly missed, De Bry; but we have reserved our next article for the study of the two artists who bore it.

THE TREATMENT OF SEWAGE.

IN our previous article on this subject * reference was made to the reports, only recently published in the Society of Arts *Journal*, of Dr. Tidy's paper on the subject read in the earlier part of last year. A reference to the opinions elicited in discussion on the same occasion, and also published in the Society's *Journal*, may be of interest as a supplement to the consideration of the subject.

The discussion was commenced by Lieut.-Col. A. S. Jones, V.C., who disposes of the sewage of Wrexham on his own farm, and is the author of the pamphlet published by Messrs. Spon, "Will a Sewage Farm Pay?" Dr. Tidy had said that the sewage mud accumulated on the surface of irrigated land, to which Colonel Jones replied that any farmer, or labourer even, could give the most positive and direct contradiction to that theory. He had applied large quantities of raw sewage, sludge and all, to fallow land every winter for fifteen years, and never found the pores of the soil clogged when it had been ploughed up for roots in the succeeding spring. Frost and heavy rain were also common bugbears with indoor advocates of chemical precipitation, which the farmer knew how to combat without much loss of purification, as percolation goes on through the soil all the same under the sheet of ice, and it is quite unnecessary, as well as unusual, to let the sewage run over frozen ground into a river.

Dr. Carpenter had seen the processes of sewage disposal in various forms and conditions, and he could say with the utmost satisfaction that the only arrangement which would fulfil all the requirements was the utilisation of the sewage by irrigation. The great point was not to let the land get water-logged or deprived of atmospheric air, and it must be broken up pretty often, so that the air would get in. He had seen cases where the sewage was allowed to go on the same plots for two or three days, or even two or three weeks, and then they wondered they could not get a crop. No sewage should go on to one plot for more than twelve hours, and then should be turned on to another, and the air must be allowed to get to the roots of the plants. Again, the land should never go beyond three years without being broken up, and it was the failure to do this which often led to difficulties. That was a fault on the part of the farmer, not of irrigation. Irrigation was the right thing, and it was even better to pump than to send the sewage into a river or the sea.

Apparently to strengthen his case, Dr. Tidy had said that "A precipitation scheme by itself has these two enormous advantages over irrigation, viz., its efficient working is totally independent of weather; and, if sufficiently large works be erected, any emergency of quantity can be met." This is contrary to all reason, and the facts of cases, unless special stress be laid upon the reservation that sufficiently large works be erected. With works of ordinary dimensions excessive quantities of sewage cannot be dealt with in tanks; and if tanks be made large enough to deal with these quantities in emergencies they become unnecessarily large for those of ordinary times. Dr. Tidy was attempting to show that with a tank system the separation of the bulk of the rainfall from the sewage need not be done, but Mr. Baldwin Latham said the first important point was that of separation; they were told that they were not to separate the rainfall from the sewage; and they were also told that in time of rain the sewers were flushed out, and the consequence was that at that time the sewage was much fouler than at any other time. It seemed to him that that was the very strongest argument for separation. If as much rain as possible were kept out of the sewers the volume was considerably reduced; if it were not kept out, the average daily flow might be increased twenty to thirty times in one hour by a heavy shower; and instead of this being unimportant in chemical processes, it was far more important than in irrigation, because, to carry out such a process properly you wanted large tank space, and if in a limited time thirty times as much rain as the ordinary volume of sewage came down, as the tanks generally held only six hours' sewage, instead of having six hours for precipitation there would only be a few minutes, and consequently the sewage must go away in a polluted form.

As to the difficulty of disposing of the sewage to farmers Mr. Peregrine Birch said that in some parts of England the voluntary system had been found to be extremely useful; for instance, at Cheltenham, where precipitation tanks had been erected which did not efficiently perform their object, the Town Council had spent several thousand pounds in carrying the sewers further down the valley, and bought two farms of their own, and had made arrangements with the farmers on the route to take the sewage when they wanted it, and when they did not want it it was put upon the land belonging to the Corporation. They received from the farmers sums varying from 4s. to 15s. per acre for a dressing. When the farmers did not want the sewage the Corporation irrigated their own grass lands, and the result had been that instead of spending 6d., 9d., or 1s. per head of the population on using the tanks ineffectually they had got out of the difficulty at the cost of 1½d. per head, paying off at the same time the cost of 300 acres of valuable land, so that at the end of forty or fifty years they would be possessed of a fine estate, instead of having a liability upon them to improperly deal with the sewage at a cost of 1s. or 9d. per head. The position taken up by Dr. Tidy was that precipitation, irrigation, and intermittent filtration had each its own advantages and disadvantages, which Dr. Percy Frankland said was a very safe position, and there was, no doubt, much truth in the statement; and that different processes were suitable to different places; but it should be clearly borne in mind what were the intrinsic capabilities of each process. People who had to select between the competing methods of purification ought to bear in mind what it was possible to accomplish by each process. There could be no doubt that sewage precipitation was adequate for some purposes, but it was an indisputable fact, which should never be lost sight of, that the best known processes of sewage precipitation could not accomplish such purification as it was possible to obtain by the best methods of irrigation and intermittent filtration. With regard to the precipitating material which the Metropolitan Board of Works were prepared to recommend for adoption, Dr. Dupré said that, in conjunction with Mr. Dibdin, he had made various experiments in the matter, and found that by using a larger quantity of precipitating material better results were not obtained. He thought very few people had any notion of the quantity of precipitating material necessary for the metropolitan sewage. One grain per gallon added to the London sewage represented ten tons of material per day; the total amount of material used in the A B C process was about five times that of the suspended matter in the sewage, or from 150 to 200 grains per gallon of London sewage per day, equal to 2,000 tons to be used daily, which came to 5,000 tons of pressed cake, chiefly formed of material which had been added. What was it added for? Not to produce any real benefit, because when this process was used the organic matter was 18·2 grains per gallon in the sewage, and 18·4 grains per gallon in the effluent. What was the object of adding 2,000 tons of material daily to sewage for the mere trouble of collecting it again and pressing it at a considerable expense? Professor Dewar took it that Dr. Dupré would admit now that the effluent ought to be oxidised, in order to make it anything like fit to be placed in a river. It was exceedingly surprising that there should be no limit to the amount of chemicals which could be used. It would seem that neither was there any particular substance which was better than another. The combination Dr. Dupré had selected, in conjunction with other distinguished men, required explanation from a chemical point of view. He took it that the addition of lime and sulphate of iron gave rise to protoxide of iron, which withdrew a considerable amount of oxygen from the water. Subsequently he understood permanganate was to be added. He had not the slightest hesitation in stating that the samples of effluent that he had seen resulting from this process were the worst from any precipitation process whatever.

It is, therefore, plain that whether we regard the substance to be used, or the quantity, there is no agreement amongst chemists. Sir Robert Rawlinson pointed out, from his experience in this matter extending over thirty years, that to treat sewage by chemical deposition would not cost less than 1,000*l.* per annum for each million gallons per day. In some cases the cost would be double that. He thought that if there was any chance of dealing with sewage with the nearest result to profit, it was by irrigation, although neither this nor any other way of disposing of it could be looked upon as positively profitable. In some cases, where the land was in sufficient area,—where it was of an exceptionally good quality for sewage,—crude sewage might be put on the land without any previous tank process; and in cases where an area was less than 300 or 400 acres, expensive and permanent carriers of any kind were not required. Where the area was from 500 to 2,000 acres, then it might be necessary to construct certain leading permanent carriers over the ground. A vast amount has been wasted by young engineers laying out small farms of 200 or 300 acres with costly permanent carriers, which had been an obstruction to the irrigation process. What was wanted in those cases was rough-and-ready carriers made with the plough or the spade. The crude sewage was to be taken to the highest point, and passed along contour lines gradually over the land. At certain sewage farms expensive depositing tanks had been made, but it was soon found that they became a nuisance.

The process of precipitating the sewage of the metropolis at the Barking outlet, and then carrying the residue down the Thames to the sea, was declared to be a monstrous proposition. Reasoning from small to great, about 10 tons of sludge per week are precipitated from the sewage of a population of 1,000. This quantity may be reduced by presses to 2 tons, or 104 tons of pressed sludge in one year from each thousand of the population. Taking the population of London at 4,000,000, there would be 40,000 tons of sludge per week, or 416,000 tons of compressed sludge per annum. If it cost 2s. per ton to produce it, the annual outlay would 41,600*l.*, besides the cost of the removal. To produce this sludge separate from the sewage, 165,000,000 gallons of sewage per day would have to be chemically treated, and each million gallons a day would cost 11,000*l.* per annum, or a total in one year of 1,650,000*l.* But if the sewage were raised by engine-power into a conduit which would convey it in the direction of Canvey Island or elsewhere, and if the conduit passed through an agricultural district, it could be disposed of on land, if the Board had power to purchase the land at its agricultural value for the purpose of letting it out for sewage irrigation, and so the crude sewage of the metropolis would be utilised between the present works and the sea, not only without any ruinous cost to the parties establishing the works, but with some chance of an income, and certainly not with the enormous loss which would have to be faced if the Board attempt to treat the sewage with chemicals. The Canvey Island scheme, with which Mr. Bailey-Denton's name is prominently associated, is based on the following particulars:—The population is assumed to be six millions; the quantity of sewage from the metropolis 200 million gallons daily; from the Lea Valley twenty millions, or a total of 220 million gallons per day.

The rateable value, including all places on the Lea south of Waltham, is set down at 32,162,864*l.* One penny in the pound raises 134,012*l.* The cost of the main conduit, with distributing conduits and appliances and the immediate formation of earthen basins to receive the solid portion of the sewage by settlement, and including also filtration beds to cleanse the liquid after its separation from the solid, and the purchase of the island (4,383 acres), and including compensations, would be 4,673,017*l.* The working and current

* See p. 70, *ante*.

expenses would be 195,525*l.* Three half-pence in the pound more than suffices to raise this amount.*

"THE CONVERSION OF ENGLAND:"

A DRAMA WITH HISTORICAL COSTUMES.

THE notices which appeared in anticipation of the performance of this play, stating that it had been in rehearsal for two years, were sufficient to excite the interest of any archæologist, and although the statement proved to be an exaggeration of the fact that it had been performed two years ago, there was little room for disappointment.

The drama describes the mission of St. Augustine of Canterbury to Ethelbert, king of Kent, and the conversion of the Anglo-Saxons to Christianity; it is written by the Rev. R. H. Cresswell, whose name alone appears, the performers being announced as divers persons connected with the Church of St. Peter, Vauxhall, and the performance has taken place on Monday, Tuesday, and Wednesday evenings of this week, at the Boys' Parochial School, in Macaulay-road, Clapham. The tickets of admission had been eagerly secured, and the seats were all filled.

The drama is divided into ten scenes, each of which required elaborate setting, with the result that the intervals between them were long and the scenes themselves were so very short that the curtain seemed to fall almost before the scene had well begun; there was thus no time to make such careful notes of the scenery and costumes as they deserved, and, it is to be hoped, that the performers will allow themselves to be photographed in groups so as to preserve what has undoubtedly formed the subject of considerable study.

The first scene was the Forum of Rome, where the English children are sold as slaves, and gave Gregory the chance of making his three historical puns; but as we read that he was then a deacon, this may be held as an excuse for them. *Basilides*, the slave dealer, does business with *Theodora*, a Roman lady, who hands over her purchase to the Christians.

The second scene transports us to Heathen England, where Sebba, the priest of Woden, is officiating at an altar around which a troup of children dance various measures; their really bare legs and feet giving a very natural tone to the scene, and being a great relief from the meretricious effect of tights, though somewhat conducive to rheumatism. After the dance, Sebba tests the fate of a captive by mystic rites, which result in his condemnation, and Queen Bertha, who enters, pleads in vain for his life, she being a Christian.

In the third scene we find Augustine and his brethren of the Monastery of St. Andrew at Rome, seated at a table well supplied with food, of which they were apparently not hungry enough to partake. A messenger brings a letter from Gregory appointing Augustine to conduct the mission to England, and he accordingly chooses the four monks who are present,—Lawrence, Peter, Sergius, and Placidus,—to accompany him. The latter is the one laughable character in the piece, and, as the name suggests, should be the very opposite of a self-denying man; it was, however, taken by an actor of so emaciated an aspect that one felt, all along, that he was regretting that he had left the food untouched.

The fourth scene is laid at the Monastery of St. Honorat, in the island of Leonis, where the monks fall in with a Frankish count, whose gruesome accounts of England, which he has visited, go far to increase their despair, especially that of Placidus.

The fifth scene brings matters to a worse pass, for the monks are attacked in a forest near Pont-de-Cé, and become separated; however, they manage to find one another, and then divide themselves into two parties, one to watch and sing psalms, and the other to sleep,—which, by the way, they do without previously saying their prayers.

The sixth scene is at the Palace of King Ethelbert at Canterbury, and is, in the matter of costume, the most ambitious of all. The simple dress of the king, without a mantle, was remarkable. A messenger brings word of the arrival of the monks, and the king takes counsel of his nobles whether they should be admitted to his presence,—a point strongly urged by the queen, but overruled by the nobles,—and the king decides that he will go and meet the monks instead.

The seventh scene is, therefore, on the Downs above Minster, in the Isle of Thanet, where the king, accompanied by his court, hears what the monks have to say. These enter, duly preceded by acolytes, who are not accounted for by the previous scenes and are presumably, recent converts. The monks stand behind Augustine, who is seated, and observes the effect of his appeal conveyed to the king by an interpreter. In doing so the actor committed the little forgetfulness of listening to the interpreter, whom he presumably could not understand, instead of only watching the face of the king. The pious fervour of this character was, however, beyond all praise, especially when he received the king's permission to convert his people, for which the queen comes forward to render heartfelt thanks.

In the eighth scene, in St. Martin's, Canterbury, the king is baptised and duly clothed in white, and a grand procession files out of the church, taxing the limits of the stage.

The ninth scene transports us to the porch of the cathedral at Arles, inside which Augustine is being consecrated Archbishop of Canterbury. In due time he issues forth, preceded by a crozier, and wearing the mitre, of loose material, indented along the centre, but not the pallium.

The tenth scene, laid near St. Augustine's oak, is a supplementary one, in which is represented the fact of the ultimate valuable co-operation of the British and Scotch churches in the conversion of the Anglo-Saxon races. Augustine's death is announced by his successor, Lawrence, one of his four companions.

This closed a performance which one would like to see repeated on a larger stage to a larger audience, if only as a means of archæological instruction in a pleasant form.

SALT FOR REMOVING SNOW.

THE recent snow-storms have, as we have already observed, aroused the indignation of the British ratepayers, many of whom, especially in the metropolis, have been heaping contumely on the devoted head of all officialdom by means of letters to the *Times* and other journals. The use of salt for removing snow has occupied a prominent place in these outbursts, and has been awarded a full share of abuse. Under these circumstances it will be interesting to note what has been done in our sister capital of Paris, where the trouble from snow-storms is often greater than in London.

In the *Annales des Ponts et Chaussées* are given some particulars of the first efforts made by M. d'Ussel in 1880, to thaw the compressed snow caused by the passing of vehicles. During the winters of 1879–80 and 1880–81, nearly 200,000*l.* was spent in the by no means successful efforts to remove the snow from the Parisian streets. At that time there was a heavy tax on salt, but in order that it might be used for the removal of snow this tax was remitted on the common kinds of salt, which would be unsuitable for culinary and table purposes. About 4,000 tons of salt were accordingly provided for last winter, and a regular service was organised for clearing away the snow before it became trodden down by pedestrians or compressed by the wheels of carts and carriages. This is an important point, as the ice formed by the compressed snow is much more difficult to get rid of than the virgin snow. The salt is scattered on the streets as soon as the snow begins to fall fast, about 1 dram per square foot for each 4-10ths of an inch of snow fallen being used, provided the temperature is not much below freezing. The traffic, in place of causing the snow to stick to the ground, only helps to mix it and the salt together, producing a liquid that will not freeze at a temperature above 5° Fahr. In countries where the thermometer is apt to fall so low as this the system would be inadvisable. The cold liquid should be swept into the drains as soon as possible, but it is said to do no harm to asphalte-paved and wood-paved roads. On macadamised roads, however, it causes disintegration, and should not be used.

It is said that there is no method so cheap as this for the removal of snow. Steam has been tried but does not compare with it in the matter of cost. Formerly in Paris each centimètre, or 4-10ths of an inch, of snow that fell cost the city about 2,400*l.* to remove it, but by the use of salt about two-thirds of this sum would be saved, the expense being only about 800*l.* for the same result. With regard to the point, so much stress has been laid on, in this country lately, the injurious effects of the "freezing mixture" on the boots of pedestrians and the hoofs of horses, it is claimed that the latter disadvantage can be obviated by greasing the inside of the hoof, and if the liquid be promptly swept into the drains, by sweeping-machines on the roads and "squeegees" on the pavements, the discomfort to pedestrians will be very small and of short duration.

Details of this method of removing snow by salt may be found in the eighty-seventh volume of the "Proceedings of the Institution of Civil Engineers," p. 47, *et seq.*, in which there is an abstract of a paper by Mr. Brabant. It is said that possibly the system may not be confined to the clearing of streets of towns, but be extended to all paved roads, tramways, approaches to railway stations, and large factories. It might be also used for dealing with snow-drifts in railway cuttings, by spreading it in sufficient quantities and sweeping off thin layers. "The small cost of the system," it is said, "and the advantages to traffic are sufficient reasons for an early and wide extension of the use of salt for removing snow."

COMPETITIONS.

Schools, Milverton.—At a meeting of the School Board, on Monday last, to consider the competitive designs for the proposed new Board schools, it was decided to accept those of Mr. Geo. H. Cox, architect, Birmingham.

Sewerage, Cleethorpes.—An open competition was invited by the Cleethorpes Local Board amongst sanitary engineers for the best scheme of sewerage and sewer outfall for the district of Beaconthorpe, which lies between Grimsby and Cleethorpes. The plans and report sent in by Mr. W. H. Radford, Assoc. M. Inst. C.E., of Nottingham, have been accepted as the best, and he will be appointed Engineer for the works. As the district is likely to increase considerably in population, pipe sewers of the largest sizes will be laid down. The sewage will be conveyed out to low-water mark by large iron pipes, and delivered on the ebb tide, which will take it straight out to sea. Storage accommodation is provided for the sewage during high tide, and flushing and ventilation arrangements are made.

MAP OF LONDON SHOWING THE BOUNDARIES OF SURVEYORS' DISTRICTS.

WE publish this week the fourth and concluding section of this map.

Illustrations.

AMERICAN HOUSE ARCHITECTURE.

WE give, in one of our phototype plates this week, two characteristic examples of recent American domestic architecture,—a town house and a sea-side house, the first being the Art Club at Boston, designed by Mr. R. W. Emerson; the other, a sea-side house designed by Mr. Arthur Little. Each of these illustrates, in its way, the reactionary tendencies of modern American architecture. For a long time the great defect of American architecture was that not only did it attempt no originality, but it was tame and commonplace even in its reproduction from European

* The letter of "Ferrometer," which we published last week [p. 132], conveys nothing to the point. Dr. Tidy did not refer to the area of land required for broad irrigation, as our correspondent supposes, but to the area required to act as a filter, as we pointed out; and this is, of course, very much less than that required for broad irrigation, about which "Ferrometer" gives some figures which we are not much concerned to dispute, although we may point out that he is wrong in saying that 30 gallons of sewage per individual per day is "the usual mean." Then, with regard to the effect of sewage passing through earth, the case of Edinburgh was not referred to, either by Dr. Tidy or by anybody who took part in the discussion of the subject. After a long examination of the facts of the case, the Rivers Commission reported that "the Edinburgh experience, therefore, must be quoted not as a successful example of sewage cleansed by irrigation, but rather as an instance of the largest produce raised by means of it from a limited area of land." Therefore, while we do not dispute our correspondent's statement that the effluent water of the Edinburgh sewage "contains 64·24 grains of foreign matter per gallon," yet we must say that it does not affect the question of the proper treatment of sewage.

DESIGN FOR HOUSE IN CHICAGO.

HOUSE, CORNER OF OGDEN AVENUE AND ADAM STREET, CHICAGO.

Houses in Chicago.—Designed by the late Mr. S. G. Beaumont.

materials. A persuasion of this, coupled with the influence of one or two architects of genius (of whom the late Mr. Richardson was the chief), seems to have led, of late years, to strong resolution to be original, and even with that object to return to the first simple beginnings of architecture, and reduce houses to the roughest and most unworked materials and design, in the hope of, apparently, striking out from this new beginning into some original path. The "seashore cottage" illustrates this latter tendency. The architect appears to have studiously avoided everything like "architectural treatment," even putting unsquared tree poles to carry the balconies and overhanging eaves. This appears to us an absurd affectation of rusticity which is at variance with architectural principle and true good taste. In other respects the house is certainly picturesque, especially so the octagonal turret with its simple windows, which forms the outworks, so to speak, of the residence.

The Boston Art Club illustrates the manner in which some able American architects are endeavouring to develop hints from Romanesque forms of architecture into a style, or at least a manner of their own. The various details of this new American style seem still to require harmonising and refining, but there is force and picturesqueness in it, and it undoubtedly promises further possibilities of development.

The two illustrations are reproduced by the phototype process from photographs.

The sketches above given of houses recently erected in Chicago came into our hands while we were arranging the publication of the two photographs. We add them as marginal notes in further illustration of this move of American architecture in the direction of the rudely picturesque. Please to observe the random rustication of the basement portion (a "note" of much recent American house architecture), and the equally random, though effective, style of sketching. These houses were designed, oddly enough, by an architect (Mr. S. G. Beaumont) who went out from England, but appears to have contrived thoroughly to indoctrinate himself into the "new American" style. We regret to add that Mr. Beaumont, who was formerly in the office of Messrs. Banks & Townsend, in London, died not long after he commenced practice in Chicago.

TANAGRA TERRA-COTTAS.

THE illustrations given are photographed from three of the reproductions of these charming little Greek toys, as they may be called, which are being made and offered to the public by Messrs. Bellman & Ivey.

Every one who has seen the numerous examples of these statuettes in the British Museum and at Berlin must have been charmed with the combined grace and natural simplicity of their pose and expression, and the very pleasing arrangement of the drapery in most of them. The copies are exceedingly good reproductions, and form very graceful household ornaments.

There is a great general similarity in the design and pose of many of these statuettes, though, as far as we have observed, all the examples in the British Museum differ in detail. What is not generally known, however, is that these figures show evidence of having been cast in moulds, and only partially touched on by hand afterwards. A good many replicas have been found; indeed, a German authority says they have been found "by the dozen"; but what strikes one is that there should be so much variety as there is, and so many different moulds made for figures which, after all, differ so little in character.

Mr. A. S. Murray writes from the British Museum,—"I can show you in some of our terra cotta here that the front of the figure has been pressed into a mould; you can see in the interior the marks of the fingers of the *keroplastes*, and you can see where he has joined on the clay that forms the back of the figure; the marks of his modelling-stick where he has roughly sketched in the folds of drapery which had to be carried round from the front are obvious enough. We have a mould of the front of a figure and several moulds of faces."

The figures have apparently all been coloured; the colour is visible on the hair of nearly all of them, and in many parts of the drapery. Messrs. Bellman & Ivey seem to have arrived at reproducing the effect of the statuettes as they are now, giving touches of colour in the same way, and leaving other parts clay colour. We should have thought it more reasonable to endeavour to reproduce them as they would have been when new, or else to omit the colour altogether, and give the form only; as the reproduction of the actual state has no archaic value in a copy; but it is possible they would have been less generally attractive than by the present treatment.

Part of the interest of these figures arises from their obviously realistic character, and the picture they give of the Greek lady as she looked and dressed. It may be observed that the dress-reforming ladies, who write letters in the papers urging the noble example of Greece in the freedom of woman's dress, are entirely contradicted in their assumptions by these heavily-draped figures, in the costume of which not a suggestion of the "dual skirt" is to be seen.

DESIGN FOR ASSIZE COURTS.

THIS design, by Mr. S. B. Russell, gained the Royal Academy Schools Prize for an original design for Law Courts for a small town. The plan is effectively arranged, and has good practical points about it: the witnesses' rooms are, however, inconveniently far from the courts.

AMERICAN CHURCH, PARIS.

WE give some more of the working drawings of this building, designed by the late G. E. Street and completed under the direction of his son, Mr. Arthur E. Street, believing that they will be of interest to a good many students and designers of modern Gothic church architecture.

Northallerton Waterworks.—The Northallerton Urban Sanitary Authority have appointed Mr. A. M. Fowler, C.E., of Manchester, engineer for the preparation of a scheme for supplying the town with water. There were seventy-two applicants.

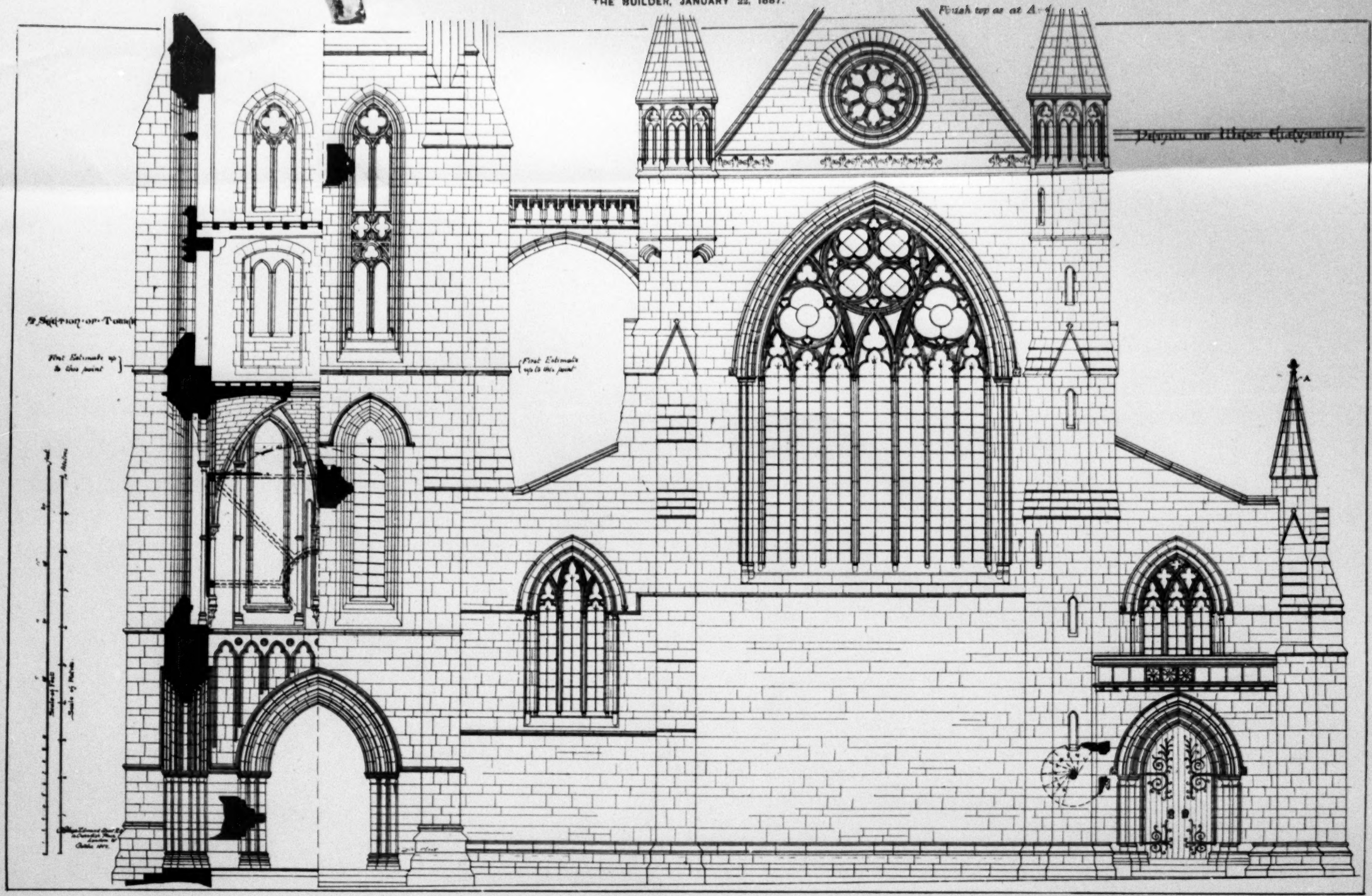


PHOTO-LITHO., SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

AMERICAN CHURCH, PARIS, (FURTHER DETAILS.)—THE LATE G. E. STREET AND MR. ARTHUR E. STREET, ARCHITECTS.

TANAGRA TERRA COTTAS: AS REPRODUCED BY MESSRS. BELLMAN AND IVEY.

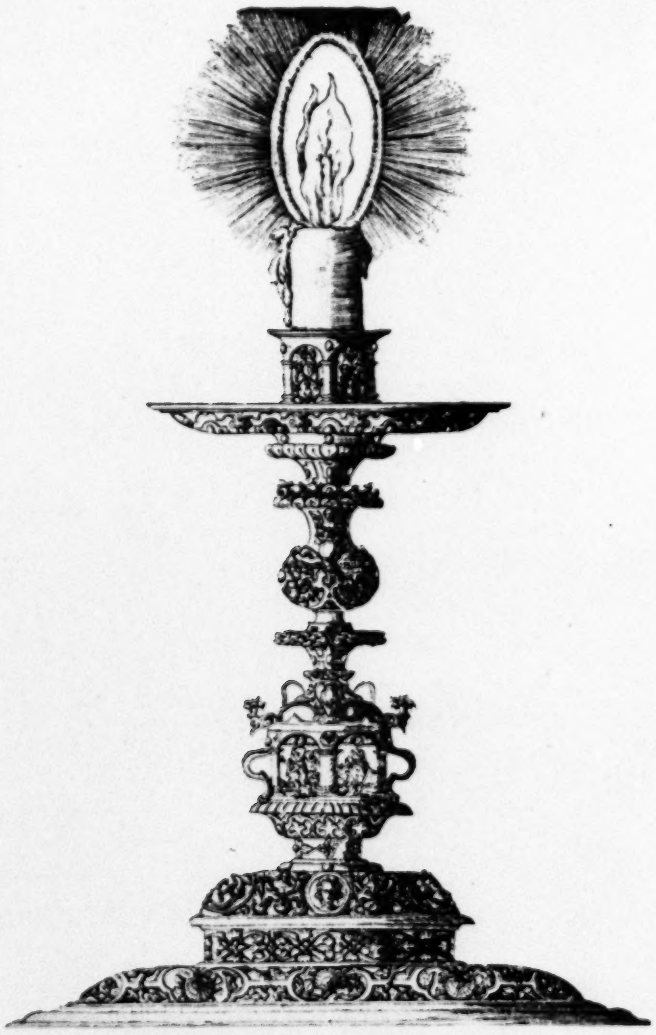
THE ART CLUB, BOSTON. MR. W. R. EMERSON, ARCHITECT.

SEA SHORE COTTAGE, MANCHESTER, MASSACHUSSETTS. MR. ARTHUR LITTLE, ARCHITECT.

AMERICAN DOMESTIC ARCHITECTURE.

TWO SCROLLS. PITTONI.

SCROLL. VISSCHER.

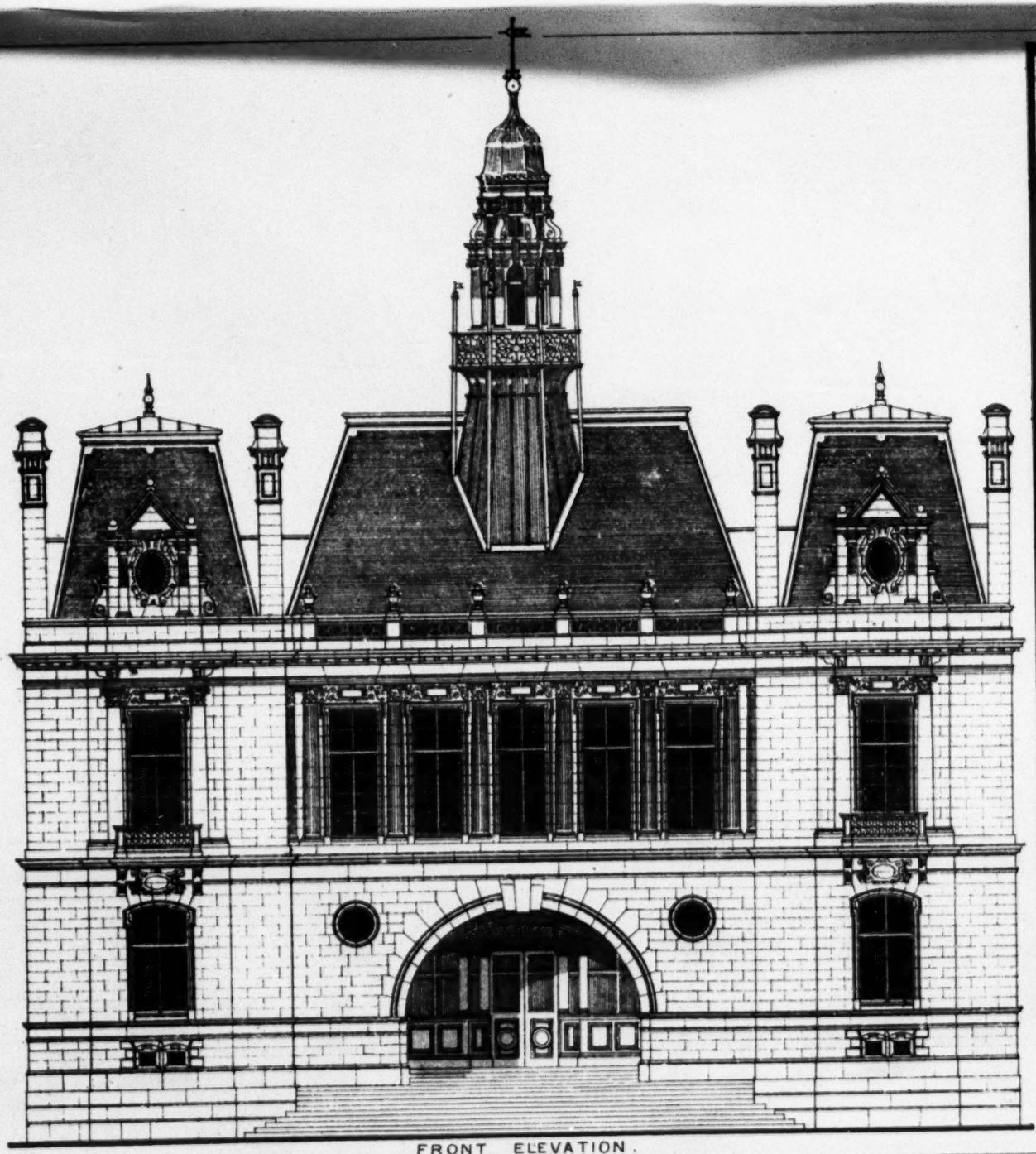


CANDLESTICK. W. JAMITZER, OF MUNICH.

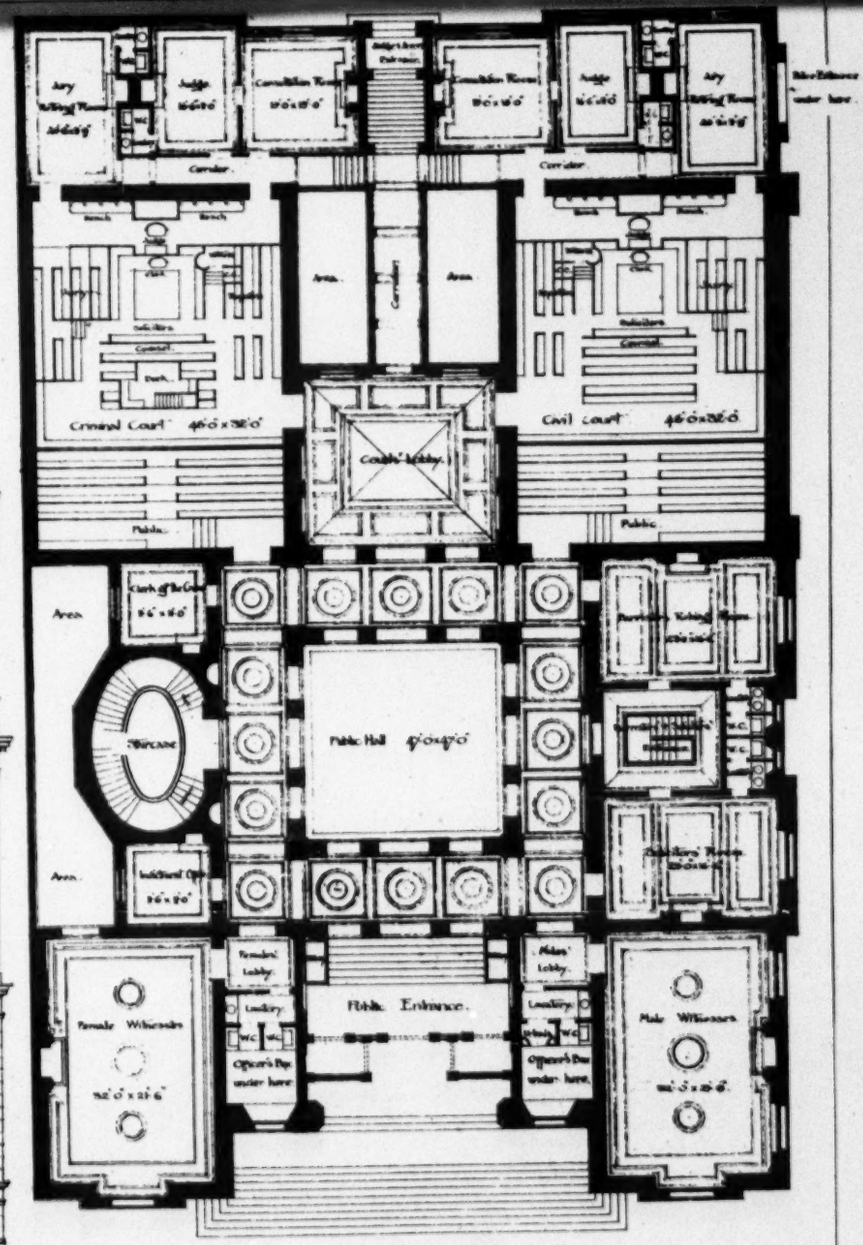
SWORD HANDLE. WOERIOT.

ILLUSTRATIONS TO A CLUSTER OF DECORATIVE ARTISTS.

ND, LONDON.



FRONT ELEVATION.



Ground Floor Plan.

PHOTO-LITHO. SPRAGUE & Co., 20, MARTINS LANE, CANNON ST. LONDON E.C.

DESIGN FOR ASSIZE COURTS FOR A COUNTRY TOWN.—By Mr. S. B. Russell.

Royal Academy Upper School Prize, 1886.

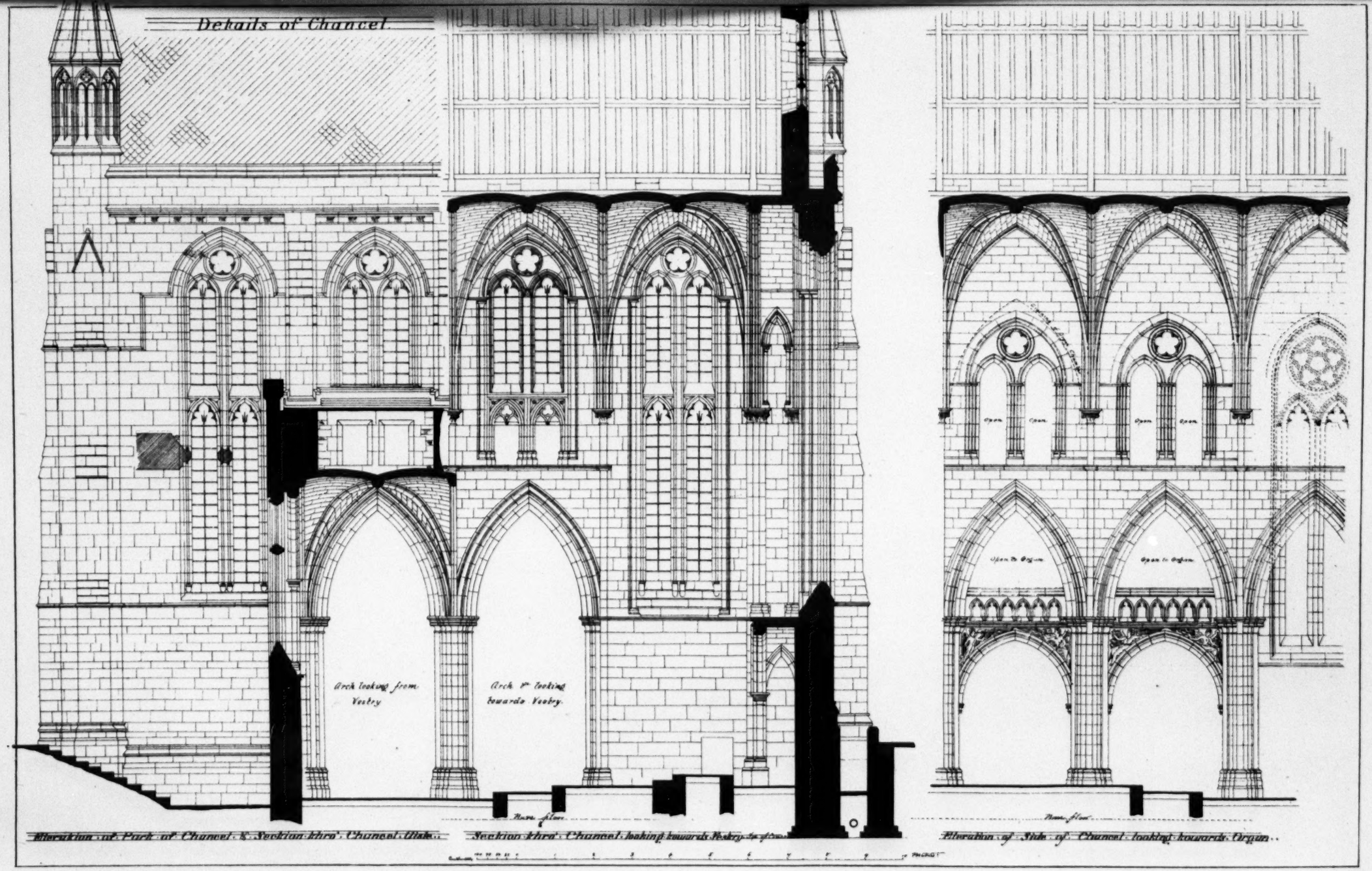

Details of Chancel.
Arch looking from Vestry
Arch looking towards Vestry
Elevation of Part of Chancel & Section thro' Chancel Wide
Section thro' Chancel looking towards Vestry
Elevation of Side of Chancel looking towards Organ

PHOTO-LITHO., SPRAGUE & Co 22, MARTINS LANE, CANNON ST, LONDON, E.C.

AMERICAN CHURCH, PARIS, (FURTHER DETAILS.)—THE LATE G. E. STREET AND MR. ARTHUR E. STREET, ARCHITECTS.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AWARD OF STUDENTSHIPS, MEDALS, AND PRIZES.

THE following is the report of the Council on Medals and Prizes, which was submitted to and adopted by the Special General Meeting on Monday evening last,—

Owen Jones Travelling Studentship.—Of the eight candidates of varying excellence who have entered for the Owen Jones Studentship this year,—the first year of its award,—Mr. Sydney Vacher has been awarded by the Council the first place. The work he has submitted shows that he has made a diligent study of colour decoration, and with this, as well as a natural love for and appreciation of colour which he seems to possess, he will be enabled to make good use of the opportunities afforded by this Studentship to his own and the general advantage. The Council have placed Mr. Gerald Horsley second, and they have awarded him the Special Prize offered in connexion with this year's Studentship by Mr. G. A. Audsley, namely, a copy of the magnificent work, entitled "The Ornamental Arts of Japan," as a recognition of the excellence of Mr. Horsley's numerous and beautiful drawings.

Pugin Travelling Studentship.—Ten candidates have this year submitted drawings for the Pugin Studentship, and the majority have attained a high standard of merit. Many of the pencil drawings especially show unusual clearness and delicacy of touch. The Council consider that the drawings and sketches submitted by Mr. Maclaren are the best, and they have awarded him the Studentship. The Council have placed Mr. Arnold B. Mitchell second, and Mr. E. H. Selby third, recommending that a Medal of Merit should be awarded to each by the Royal Institute. The fourth place has been fairly won by Mr. R. W. Paul, whom the Council recommend for a Certificate of Honour, and whose careful drawings are entirely of English subjects. Before concluding this portion of their Report the Council wish to direct the members' attention to the fact that Mr. Maclaren is a Royal Academy Gold Medallist and the holder of the Foreign Travelling Studentship of that body; while Mr. A. B. Mitchell is the Soane Medallist for last year. The best work which they have submitted for this, the Pugin Studentship, has been executed principally while fulfilling the conditions of travel attached to the prizes they had gained. The Council have consequently adopted a recommendation of the Medals and other Prizes Committee to the effect that, in future, there will be excluded from consideration in the Pugin Studentship all measured drawings and sketches which have obtained either the R.A. Gold Medal or the R.I.B.A. Soane Medallion, or which have been submitted as work done by the R.A. Gold Medallist or the R.I.B.A. Soane Medallist in fulfilment of the conditions of foreign travel attached to the two prizes referred to.

The Godwin Bursary.—The Council regret that no applications have been received this year for the Godwin Bursary, founded for the encouragement of the study of works of modern architecture abroad, and one of the requirements of which is that the candidate, who must be a British subject, should know at least one foreign language. The great importance of the subjects for which this Bursary was founded should in itself be sufficient to insure a good competition.

The Tite Prize (value 30*l.*).—The Council have awarded the Tite Prize, for which there are fourteen competitors, to the author of the design (a Classical Church) bearing the device XP. They have placed the design bearing the device of a triangle in a circle second, and that bearing the motto, "St. Luke," third; and they recommend that the former be awarded a Medal of Merit, and the latter a Certificate of Honour. It is gratifying to the Council to be able to report that so many designs have been submitted for this competition, and that they are characterised by much excellence.

The Grissell Gold Medal and Ten Guineas.—Only three designs have been sent in for this Medal, offered annually for the encouragement of the study of Construction. The Council have awarded it to the author of the design bearing the motto "Interested," which is far in advance of the two others as regards a just appreciation of wood construction; and it is one in which the equalisation of strains and the distribution of pressure appear to have been carefully studied. The sum of ten guineas to be awarded with the Medal is the gift of the Royal Institute, and the Medals and other Prizes Committee have advised the Council to recommend that this sum should be also awarded to the author of this design.

The Soane Medallion and (*under conditions*) 50*l.*—The Council recommend the award of the Soane Medallion to the author of the design (City Police Courts and Police Station) bearing the motto "Paulatim." Of the seven designs submitted it has the best plan, and its architectural character is good. The Council also recommend that the authors of the designs bearing the mottoes "Broadshire" and "Nene" be each awarded a Certificate of Honour for their architecture.

The Institute Silver Medal and Ten Guineas (*Measured Drawings*).—Five sets of measured drawings have been received, namely:—1. ("Foot-rule"), StokesayCastle; 2. ("Honoris"), Gate of Honour, Cambridge; 3. (Manners makyth Mann"), Haddon Hall; 4. ("Opus Amoris"), Gate of Honour, Cambridge; and 5. ("Spes mea"), Oakwell Hall, Bristol. The Council recommend the award of the Institute Silver Medal and Ten Guineas to the author of the drawings bearing the motto, "Foot-rule"; and the award of a Medal of Merit, with five guineas, to the author of the drawings bearing the motto, "Manners makyth Mann."

The Institute Silver Medal and Twenty-five Guineas (*Essays*).—Four essays have been submitted on the subject of "Attached Wall Piers, Pilasters, and Buttresses," bearing respectively the mottoes,—(1), "Expression"; (2), "Evolution"; (3), "Non enim tam auctores, &c."; and (4), "Palma non sine pulvere." Of these the Council recommend that the author of the essay bearing the motto "Evolution" should receive the Silver Medal and the sum of twenty-five guineas. They wish to add that the sub-committee who reported on the essays state in their report that in this essay the theory and construction of problems relating to the subject are well treated; the history of the development of wall-piers and buttresses is carefully traced; and the system of buttressing, both internal and external, has been fully considered.

The following is extracted from the minutes of the special general meeting on Monday evening last, Mr. Edward l'Anson, F.G.S., President, in the chair:—

The Studentships.—The Honorary Secretary announced that the Council had awarded the Owen Jones Travelling Studentship for the current year to Sydney Vacher, Associate, and the Special Prize offered in connexion with this Studentship by G. A. Audsley, Fellow, namely, a copy of the "Ornamental Arts of Japan," to Mr. Gerald Horsley, of 1, High-row, Kensington, W. Also that the Council had awarded the Pugin Travelling Studentship for the current year to Mr. Thomas MacLaren, of 27A, Old Bond-street, W. The Hon. Secretary further announced that the Council recommended the award of Medals of Merit to Mr. Arnold Bidlake Mitchell, of 36, Pembury-road, Clapton, E., and Mr. Edgar Harry Selby, whom they had placed second and third respectively; and a Certificate of Honour to Mr. Roland Wilmot Paul, whom they had placed fourth. Whereupon it was resolved that the recommendations be adopted.

The Tite Prize (value 30*l.* and a certificate; subject, a Classical Church, to seat 700, without galleries, and on an isolated site).—The hon. secretary announced that the Council had, under the terms of the bequest, awarded the Tite Prize to the author of the design bearing the device XP. [There were fourteen designs sent in.] The name and address of the successful candidate were found to be, Frank W. Simon, 5, Moston-terrace, Edinburgh. The hon. secretary further announced that the Council recommended the award of a medal of merit to the author of the design bearing the device of a triangle in circle, and a certificate of honour to the author of the design bearing the motto "St. Luke." Whereupon, the recommendations having been considered, it was resolved that the same be approved and adopted. The names and addresses of these gentlemen were found to be:—John Keppie, 42, St. James-street, Hillhead, Glasgow; and William Stirling, 8, Upper Chadwell-street, E.C.

The Grissell Gold Medal with Ten Guineas. (Subject: A roof over a railway station, 100 ft. by 60 ft., without floor supports; wood construction, without iron ties; central lantern light; height of walls, 40 ft.)—[Three designs submitted.] The Hon. Secretary announced that the Council had, under the terms of the bequest, awarded the Grissell Gold Medal to the author of the design bearing the motto "Interested"; and that they further recommended that the sum of ten guineas offered with the medal should also be awarded. Whereupon it was resolved that the recommendation be adopted. The name and address of this gentlemen was found to be:—James Strong, 29, Queen-buildings, Dale-street, Liverpool.

The Soane Medallion and Fifty Pounds (Subject, City Police Courts and Police Station, for a provincial town).—The recommendations of the Council respecting the award of the Soane Medallion, and (subject to the usual conditions) the sum of 50*l.*, were:—The Medallion, &c., to "Paulatim," a Certificate of Honour to "Broadshire," a Certificate of Honour to "Nene." [Seven designs submitted.] Whereupon it was resolved that the Soane Medallion, and (subject to the usual conditions) the sum of 50*l.* be awarded to the author of the design (No. 5) bearing the motto "Paulatim." The name and address of the successful candidate were found to be, Francis Edward Masey, 18, Gordon-street, Gordon-square, W.C. It was further resolved that the remaining recommendations in respect of Nos. 1 and 4 be adopted. The names and addresses of these gentlemen were found to be, Alfred Whitehead, 1, Olinda-place, Bagby-fields, Leeds; and Arthur Sykes, 16, Brunswick-square, W.C.

The Silver Medal and Ten Guineas: Drawings (Measured Drawings of actual Buildings).—The recommendations of the Council respecting the award of the Institute Silver Medal and ten guineas (drawings) were:—The silver medal and 10*l.* 10s., "Foot-rule; a medal of merit and 5*l.* 5s., "Manners makyth Mann." [Five designs submitted.] Whereupon it was resolved that the silver medal and ten guineas for measured drawings be awarded to the author of No. 1, bearing the motto, "Foot-rule," for drawings of Stokesay Castle. The name and address of the successful candidate were found to be James H. Cook, 12, St. George's-crescent, Liverpool. It was further resolved that the remaining recommendation in respect of No. 3, for drawings of Haddon Hall, be adopted. The name and address of this gentleman were found to be Frank Bellis, 6, Abbey-square, Chester.

The Silver Medal and Twenty-five Guineas (Essays: subject, Attached Wall Piers, Pilasters, and Buttresses).—The recommendation of the Council respecting the award of the silver medal and twenty-five guineas (essays) was, the silver medal and twenty-five guineas to "Evolution." [There were four competitors.] Whereupon it was resolved that the silver medal and twenty-five guineas be awarded to the author of the essay (No. 2) bearing the motto "Evolution." The name and address of the successful candidate were found to be, R. Elsey Smith, The Knoll, Upper Richmond-road, Putney.

The subjects for medals and other prizes, 1888, were then considered. These we will give next week.

ARTESIAN WATER SUPPLY IN LONDON.

THE Commissioners of Sewers for the City of London, actuated by a spirit of resistance to the enhanced charge for water levied by the New River Company, have resolved on an experiment in well-boring. The increased levy on the City by the water company is simply due to the fact that the right is claimed to charge on the annual value, now defined under the Torrens Act to mean rateable value. As the value of property in the City goes up, the sum chargeable on the householder for his water-supply increases *pro rata*, the result being that in the case of large business premises, where little water is consumed, the price of the water actually drawn from the main is about equal to that of beer. The fate of the City, with a decreasing population and an increasing value, is that of consuming less water and paying more for it. Of course there is another side of the question, but this is the one which more especially engages the attention of the Commissioners, and it is on this that their action is founded. There is water in the chalk under the City, and the Commissioners intend seeking

for it with the immediate object of getting a supply for the Artisans' Dwellings which they have erected in Petticoat-square. At that spot a boring is to be made, and the cost is estimated at about 2,100*l*., including engines, pumps, and buildings, and laying on the services for the supply of the dwellings. The rateable value of the premises to which the water is to be laid on is 2,225*l*. The New River Company make certain extra charges for water-closets, and it is stated that the present cost of the supply is about 100*l*. per annum. As the proposed artesian well will not be exactly what the name implies, but will require the aid of a pump worked by engine-power, it is not clear that the Commissioners will gain any immediate pecuniary advantage by their enterprise. But their object lies farther ahead, and they are going on in the avowed hope that the experiment will be "of considerable value in determining the mode of proceeding best calculated to advance the Commissioners' efforts towards providing the citizens with a cheaper supply of water."

The first thing is to get the water, and we will pass by for the present certain considerations as to what may best be done with it when obtained. Deep wells are not new things in the City, and of this the Commissioners are aware. There is a well of this kind at the Bank of England, sunk in 1851, and the Commissioners have been informed by the authorities of the Bank as to its character. It enters the chalk at a depth of about 230 feet from the surface, and descends into that stratum for a further depth of 100 ft. For several years the supply yielded by the well was good and plentiful, but more recently the supply has been less satisfactory, and the cause of the change has not been ascertained. On data furnished in respect of this and other wells the Commissioners expect to reach the chalk at a depth of between 200 and 300 ft. from the surface. The subject has been carefully gone into by Mr. J. Voce Moore, the Chairman of the Commission, who has collected a mass of information on the subject, which has materially assisted the Commissioners in deciding as to the course they shall pursue. Concerning the well sunk by Mr. De Keyser at his hotel at the eastern end of the Victoria Embankment, it appears that the flow of water is large, although the well is not so deep as that at the Bank of England, and the water itself is softer than that generally obtained from the chalk.

Few persons, perhaps, are aware of the extent of the supply drawn from the chalk in the metropolitan area, independently of the water companies. A single firm of engineers, Messrs. Tilley & Son, of Walbrook, have sunk or bored more than fifty wells into the chalk in London. These operations have extended over a long series of years, but one of the latest examples is that of a deep well just finished at the Grosvenor Hotel, where the yield amounts to about 30,000 gallons per day. It is said that where the consumption is not less than 10,000 gallons per day, it is cheaper to take water from a deep well than to take a supply from a company. For small works gas engines are generally employed to actuate the pumps. We have heard of a brewer at Chelsea who reckons that he saves 600*l*. per annum by having his supply from a well, the cost of which was only 1,000*l*. Most of the metropolitan workhouses have wells in the chalk, and the supply to the prisons is generally obtained in the same manner. Government offices, clubs, and public baths come into the same category. But the grand principle at stake is, that the water companies monopolise the right of selling water. Anybody may supply himself, but if he attempts anything more he will be entering on debatable ground, bristling with litigation. If it is possible to dislodge the companies from the position they claim, the City Commissioners will do it. But the hydro-geological facts are not altogether in favour of the Commissioners. Apparently there is no hope of finding the lower greensand under London, and the chalk itself is so compressed under the superincumbent strata that its efficiency as a water-bearing stratum is diminished. Another circumstance is that the level of the water in the chalk wells of London suffers a gradual decline. The Rivers Pollution Commission of 1868 in reporting on the domestic water-supply of Great Britain, expressed their opinion that "the strata beneath London would not be found to be an available source for any important part of the metropolitan water-supply." That chalk wells in the metropolis are nevertheless useful is a matter of daily experience, and the City Commissioners can hardly fail to meet with some measure of success in the task they have undertaken.

THE UNITED ARTS CLUB.

THE inaugural dinner of the United Arts Club, which has been formed for the accommodation of architects, painters, sculptors, and engineers, was held at the Club-house, 27, Dover-street, Piccadilly, on Wednesday evening last. The President of the Club, Mr. E. I'Anson, President of the Royal Institute of British Architects, was in the chair, and he was supported by three of the Vice-Presidents (Mr. Lewis H. Isaacs, M.P., Professor Kerr, and Mr. Edmund Woodthorpe), as well as by several members of the committee and a representative body of the members at large, it having been deemed desirable to limit the number of guests rather than to hold the dinner off the club premises.

The Chairman having in felicitous and graceful terms proposed "The Health of the Queen," Mr. Lewis H. Isaacs, M.P., proposed "Success to the United Arts Club," in a very appropriate and well-turned speech. He spoke of the difficulty of election to the Athenæum Club even by candidates of eminence and great attainments; and of the fulness to repletion of the Arts Club and the Hogarth Club (the latter being for painters only). Upon these grounds he thought there was ample room for the United Arts Club, and that there were good reasons for congratulating the members on the good auspices under which they started, and on the excellent clubhouse which they had succeeded in obtaining. The opportunities of social intercourse which the Club would afford between senior and junior members of the architectural profession, and between them and painters, sculptors, and architects, could not but be promotive of great good, and he felt warranted in believing that, if judiciously managed, the Club would grow in strength and usefulness. He therefore heartily wished "Success to the Club," and begged to couple with the toast the name of Mr. Robert Walker, who had been most active and zealous in promoting the successful starting of the Club. The toast was very heartily received.

Mr. Robert Walker, in replying, dwelt on the advantages which the Club was capable of offering to the members of the several professions for whom it was intended. Members meeting in common under its roof would get to know each other better, the asperities and misunderstandings incident to professional work would be softened down or explained away, and the disadvantages attendant upon the inevitably-increasing tendency of the age towards specialism in the professions would, by means of free and pleasant intercourse between specialists in various walks of professional life, meet with a corrective. All would meet there on the broad ground of art, and the members would be pleasantly but wholesomely reminded that the profession of architecture, or of art or engineering, was a wider and grander thing than they might be sometimes apt to think it when their view was bounded and limited by the work of their own offices or studios. Another way in which the Club might be of advantage to the professions would be to appoint, by-and-by, a competent standing committee to watch the progress of legislative and other proposals likely to in any way affect the interests of art or of the members of the artistic professions. In these and various other ways *esprit de corps* among professional men would be promoted.

Professor Kerr, in proposing the health of the President, alluded in graceful and well-merited terms to the professional and social fitness of Mr. I'Anson to be the President of the Club.

Mr. H. R. Gough proposed "The Vice-Presidents," coupled with the name of Mr. Edmund Woodthorpe, who made a characteristically humorous reply.

Mr. H. L. Florence proposed the last toast, "The Honorary Secretary, Mr. A. Lowther Forrest," to whose untiring labours, he said, it was mainly due that the Club had been started on such a satisfactory basis.

Mr. Forrest briefly replied, and the formal part of the proceedings terminated.

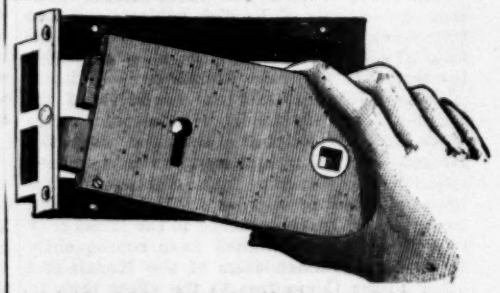
We may add that the club-house, No. 27, Dover-street, is well adapted for the purpose, and its proximity to the Royal Academy of Arts and the Royal Institute of British Architects will make it particularly convenient for members of those institutions. The Club will also be found to be of great advantage to gentlemen practising in the country who occasionally visit London. The premises contain dining-rooms, reading, writing, billiard, card, and smoking rooms, and are fitted with telephone and telegraphic tape, &c. The reading-room will be supplied with the usual papers and periodicals, including the professional journals, and it is proposed to form a reference library as soon as possible. Bedroom accommodation for the members has also been arranged for. Three hundred members have already been elected, and the committee propose to admit 200 more, without entrance-fee, at an annual subscription of three guineas for town, and two guineas for country members, after which the subscription will be raised.

We wish the Club every success.

A REVERSIBLE RIM-LOCK.

MR. JAMES HILL sends us a simple and very ingenious lock which he has contrived to act as either a left-hand or right-hand, left reverse or right reverse lock; the same lock can be used in all four positions, thus getting rid of all the difficulty about selecting and supplying right or left hand locks of this pattern. The four variations of "hands" are obtained, as may be understood on reference to the accompanying cut, by separating the body of the lock from the frame and by having latch and locking bolts the same size.

The illustration represents a *left*-hand lock, but it can be instantly converted to a *right*-hand by reversing the latch bolt (when out of the frame) and turning the lock right over. The "reverse bevels," for doors opening *inwards*, are obtained by simply turning the latch-bolt the reverse way round.



A lock which adapts itself to every door is a great boon to buyers at home, but must be a still greater boon to those abroad, because the "hands" are seldom known when requisitions are sent home: hence the doors have either to be hung to suit the locks, or the locks have to be fixed upside down!

The question of "hands" for locks has long been an international puzzle. On the Continent, in the colonies, and in America, what we term "lefts" are known as "rights"; and even at home the trade is constantly at variance in the matter of hands.

Mr. Hill's lock obviates all these difficulties. We have examined a specimen of the lock, which is perfectly simple in its working, and appears a really good and useful invention.

The Last of the Kensington Exhibition Buildings.—By order of the Royal Commission, the sale of the materials comprising the galleries, courts, annexes, and other structures lately used for the Colonial and Indian, Inventions, Health, and Fisheries Exhibitions at South Kensington was begun by public auction under the hammer of Messrs. Horne, Son, & Eversfield, within the Exhibition, on Wednesday last. The catalogue, which is very lengthy, comprises upwards of 823 lots. The chief items under notice on the first day were the Old London Street, and the Indian Palace, Durbar Hall, and the Prince of Wales's Pavilion. The Old London Street was put up in eight lots, Mr. Humphreys, Knightsbridge, securing the entire block for a total sum of 160*l*. 15*s*. The brickwork forming the Indian Palace was sold to Mr. W. Lusby for 22*l*., while the Durbar Hall found a purchaser in Mr. Sharpe for 31*l*. The Indian or Prince of Wales's Pavilion fell to the bid of Mr. Martin for 30*l*., and the Natal Tea-room was secured by Mr. Humphreys for the low figure of 8*l*. 10*s*.

A NEW METHOD OF STREET-PAVING.

OUR attention has been called to some improvements in street-paving which are the subject of a patent taken out by Mr. William White, of Abergavenny, well-known for his "Hygeian-Rock Building Composition," a material which is proposed to be used by the patentee for paving in lieu of asphalte, or in combination with granite, wood, or other materials in the manner hereafter explained. Or these materials may be used in conjunction with asphalte, the patent being applicable to the method rather than to the material used. The main object of the invention, which is applicable to footpath or roadway pavements, is to facilitate the laying-down and taking-up of the pavements, as well as to obtain a good foothold and to reduce cost. We cannot do better than quote the inventor's description of the mode of procedure:—

"I make a flat block of cement concrete, of a square, oblong, or other shape, and of any suitable dimensions. Through this block I form several apertures, larger on the one face than on the other, of a dovetailed shape. [The lower part of fig. 1

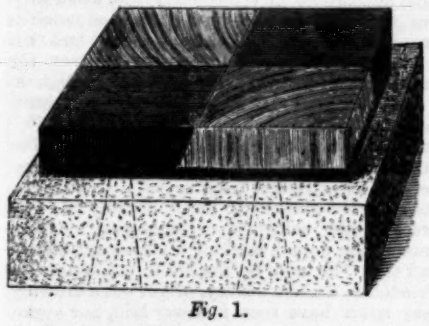


Fig. 1.

shows one of these blocks, with the conical apertures indicated by broken lines.] I then make a mould slightly smaller than, but similar in plan to, this block, and of a suitable depth. The concrete block is laid with the larger parts of the apertures uppermost, through which I pour into the mould, in a liquid state, the Hygeian Rock composition, or any kind of asphalte. The compound block, when set, can be removed from the mould, and the two parts will be firmly attached together. To provide a foothold, the upper surface of the mould can be ribbed, grooved, or otherwise [as shown in fig. 2,

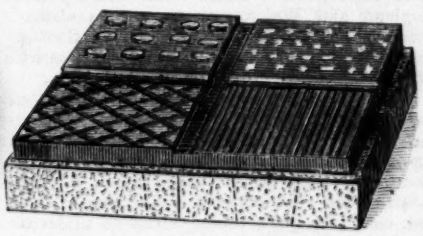


Fig. 2.

which shows four of the said concrete blocks, with their covering of composition or asphalte, the one at the top right-hand corner showing granite chippings embedded in the surface], so that the imprint is left on the face of the pavement slab. On a good foundation, I lay a layer of sand or fine ashes, duly levelled. I place the slabs, bringing the concrete part of the blocks close together, but as the asphalte or composition part of each block is smaller in plan than the concrete part, a series of grooves is formed, into which I pour composition or asphalte, which binds them firmly together, producing perfectly impervious pavements. For footways I propose that the surface shall be ribbed or corrugated, and laid with a fall to the roadway, thus forming a series of small open drains to run the water into the gutter, thus keeping the pavement clear of water, &c., and giving a pleasant foothold. When it is necessary to take up and relay, for repairs to drains or pipes, &c., or to replace new slabs, the joint or groove can be cut out and easily removed. If required, the composition can be taken off, and the same slab can be replaced again. A combination may be made of wood and composition (see fig. 1); this also would be impervious. Pavements on this principle will only take hours to lay, whereas the present system takes days. The work can be done in sections, and the blocks prepared in the yard or workshop, and brought ready for laying, instead of making the street the workshop, and blocking the roadways. The blocks can be made any size, shape, or thickness; 1½-in. concrete block faced with ¾-in. composition would be sufficient for footways. Thicker ones would be required for roadways."

It should be added that the detached concrete blocks in the figures are laid on, but are not cemented or attached to, a firm and smooth foundation-bed of concrete, such as is already used beneath asphalte and wood pavements of the ordinary type. The blocks are laid as shown, with butt-joints, but they are not cemented together, the asphalte or composition above, however, being continuous. The great merit of the invention seems to be that by its use a street could be re-paved in sections of a few yards in length night by night until completed, without interruption to the ordinary traffic. If the concrete blocks are evenly bedded, so as to prevent rupture of the connecting strips of asphalte or composition which are put in *in situ*, the pavement will remain impervious,—a very desirable thing both from constructive and sanitary considerations. Whether the new method of paving will answer all the expectations of its inventor (as we hope it may) experience of its use alone can show.

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—The fifth ordinary meeting of the current session was held at Queen's College on Tuesday evening last. The Vice-President (Mr. John Cotton) was in the chair. A paper was read by Mr. Whitworth Wallis on the "Streets, Shops, Houses, and Baths of Pompeii." The lecture was illustrated with some fine lantern views, and exhibited very clearly the characteristic peculiarities of Pompeian art and architecture. A vote of thanks, proposed by Mr. J. Cossins, seconded by Mr. Henman, and supported by Messrs. J. Cotton, T. W. F. Newton, and Victor Scruton (hon. secretary), was unanimously accorded to the lecturer for his able paper.

Manchester Architectural Association.—At the ordinary fortnightly meeting of this Association, held on the 11th inst., at the Diocesan Buildings, Mr. W. Parry in the chair, Mr. W. H. Littlewood, A.R.I.B.A., read a paper entitled "Recollections of a Tour in Italy," illustrated by photographs and water-colour sketches. The Cathedral of Milan, he said, is supposed to be the largest church in Europe after St. Peter's at Rome. It was commenced in 1386, and is not yet finished. An important competition is being contemplated at the present time for restoring some portions of it. The interior is grand by its simplicity and absence of ornament. In Venice, the most noteworthy place is the Piazza de San Marco, with the arcades surrounding it on three sides, and St. Mark's, with its towering campanile. The undulating floor of this building has often been under discussion, the late Mr. Street being under the impression that this was symbolical, and designed to represent the waves of the sea, but there can be little doubt that Signor Saccardo's theory is the correct one, viz., that the depressions arise from the settling down of the *débris* used in filling up the crypt, which formerly existed under the structure, the old piers having been left in, thereby preventing any settlement where they occur. The Loggietta at the base of the Campanile is a fine piece of architecture, by Sansovino, and is now used as an auction-room and office for the sale of lottery tickets. After St. Mark's Square, perhaps the Piazetta is the most important, flanked on the left by the Doge's Palace, and on the right by the Library, which forms a portion of the Royal Palace. In Rome, it might be noticed that what was characteristic in the costumes of the people was passing away. This is rapidly becoming the same all over Europe. St. Peter's takes precedence of all other churches in Europe, both in its architectural beauty* and size, as will appear from the following dimensions (comparative lengths marked on the floor):—St. Peter's, 609 ft. in length; St. Paul's, London, 521 ft.; Milan Cathedral, 439 ft.; St. Paul's, Rome, 415 ft.; St. Sophia, Constantinople, 356 ft. Mr. Littlewood then described the principal features of the Vatican, Pantheon, Temple of Vesta, and the Colosseum, and concluded by detailing the chief objects of interest in Naples, giving a very interesting description of Pompeii.

Edinburgh Architectural Association.—At the last meeting of this Association, held in the Professional Hall, 20, George-street, the President, Mr. Hippolyte J. Blanc, occupied the chair. After the usual preliminary business was disposed of, a paper on "Ancient Mediæval and Modern Locks and Keys" was read by Mr. Harry W. Chubb, A.M.I.C.E. The interesting ethnological comparisons supplied by the discoveries of keys of similar shape and use in ages and countries far apart were first referred to. The paper then described the growth of the rudimentary lock, which was actuated by a sickle-shaped key, tracing its origin from the plain bar sliding in staples. Further development was stated to have resulted in the Egyptian lock, the sliding bar appearing in this lock, but in a hollow form, the means of retention when in its locked position being afforded by pins, which dropped into it from its staple when shot home. A lock of this kind is indicated on the wall sculptures of the Temple of Karnac, and is in use in Egypt at the present day. The wooden locks of the northern isles were shown to be analogous to the Egyptian locks. It is in the Roman locks that traces of the system of "warding" first appeared, combined also with the falling pins already alluded to. Seven varieties of Roman keys attached to finger-rings were exhibited in diagrams, and it was pointed out that in one of these the barrel was bored through from end to end, thus allowing accumulated dust to be pushed out. *Apropos* of this, it was curious to note that within recent years four patentees had applied for protection of the same idea in England. Padlocks were treated as forming a distinct branch, and being specially connected with travel, the English kinds had become widely distributed. The same mechanical arrangement that was used in the Roman padlock was seen at the present day in those of China. The absence of any distinctive Byzantine locks and keys was commented upon, and the gradual growth of ornament upon this form of metal was sketched from the beginning of the twelfth century, as it advanced through the various developments of the Pointed style. The various stages of this advance were illustrated by crayon drawings, in which all the details were artistically elaborated, together with those of the Transitional and Renaissance periods. Up to the commencement of the present century the only security attained was by complex systems of "warding," excepting the still well-known puzzle padlock, which was probably invented in the earlier part of the seventeenth century. The state of perfection of modern knowledge and practice in lock-making was briefly touched upon, special reference being made to locks not commonly known in England. A Chub lock was exhibited, which showed that a variation of only the two-hundredth part of an inch in one of the steps of the key was sufficient to render the key useless. At the close of the paper a vote of thanks was awarded Mr. Chubb for his paper, and also to Mr. C. S. Wimbush for the drawings with which it was illustrated.

* We need hardly say that we entirely dissent from this opinion, which does not say much for Mr. Littlewood's judgment as a critic of "architectural beauty."—ED.

OBITUARY.

Mr. George Bell, F.R.I.B.A.—The death of Mr. George Bell, F.R.I.B.A., of Glasgow, was announced by the Secretary of the Royal Institute of British Architects at the special general meeting of that body on Monday evening last.

Sir Francis Bolton, R.E.—The death was recently announced of Col. Sir Francis Bolton, R.E. He was born in 1831. In 1868, in consideration of special military scientific service, he was given an unattached majority. He retired in 1881 with the rank of colonel. Sir Francis was the inventor of the system of telegraphic and visual signalling which was introduced into the Army and Navy in 1863. For these services and other improvements and inventions in regard to warlike material the Queen, in 1883, conferred upon him the honour of knighthood. Sir Francis, who was a civil engineer, founded, in 1870, the Society of Telegraph-Engineers and Electricians. Since 1871 he had been Water Examiner under the Metropolis Water Act. His recent services in connexion with the South Kensington exhibitions will be fresh in the memory of the public, especially his direction of the illuminated fountains.

Mr. Stephen Tucker, F.S.A., Somerset Herald, died at his residence in the Albany, Piccadilly, on the 6th inst. Mr. Tucker, who was in the fifty-second year of his age, was the youngest son of the late Mr. Edward Tucker, of King's Nympton, Devon. Having previously held the office of Rouge Croix Pursuivant, he was appointed Somerset Herald in the year 1880 in succession to the late Mr. J. R. Planché.

CEMENT TESTS.

SIR,—In your issue of the 8th inst. you give in "Notes" [p. 74] a summary of the results of the tests and examination of German cement made during the last year by the German Cement Makers' Association.

The information is of great value to the cement industry and to all interested in the subject in this country, but I am sure I am not singular when I say that we who are interested in the industry here feel a little jealous, not to say nettled, at having the quality of German cements put before us in such a lucid and clear manner, while the successes of our own manufacturers and the quality of the cement manufactured by them is more or less ignored.

This is, no doubt, the manufacturers' own fault, for, not having a trade association, they are unable to lay the result of tests before users and buyers here. I am, however, to a limited extent in a position to give such information as will place the English manufacturer on his proper footing, and I trust, therefore, you will find room in your columns for this letter.

The following is a short summary of results from my testing books for the year ending December, 1886. It must, however, not be forgotten that many of the cements are sent to me for testing because, in some way or another, they have not complied with the terms of a specification, and may therefore be considered more or less damaged, and it would therefore be manifestly unfair to take the lowest results obtained as an indication of the quality of the manufacture of the country. The results given are from about 250 samples representing a bulk of, perhaps, one to two hundred thousand tons.

Fineness of grinding, taken on a sieve having 4,900 holes to the square inch. The sample having the greatest fineness left a residue of only 1 per cent., and 16 per cent. of the samples left less than 10 per cent. residue, while the coarsest left 29 per cent.

The time of setting varied from three-quarters of an hour to 24 hours; but only about 3 per cent. of the samples took more than 12 hours to set, the usual time being from 1 to 5 hours.

The greatest tensile strength shown by any sample on an average of five briquettes was:—

At seven days from gauging	706 lb.
At twenty-eight days from gauging...	890 lb.

And the highest individual briquette at twenty-eight days broke at 890 lb. Ignoring these cements that were absolutely damaged, the lowest results were:—

At seven days from gauging	352 lb.
At twenty-eight days from gauging...	399 lb.

The average strength of the whole being:—

At seven days from gauging	468 lb.
At twenty-eight days from gauging...	566 lb.

Comparing these with the German results, the German highest at twenty-eight days was only 702 lb., not equal to the English highest at seven days; and the lowest English at seven days is 30 lb. higher than the German lowest at twenty-eight days.

The results obtained with the sand test, *i.e.*, briquettes gauged of one part cement to three of standard sand, was, at twenty-eight days from gauging, average of ten briquettes in each case:—

The highest.....	306 lb.
The lowest	130 lb.
Average of the whole	231 lb.

While the highest individual briquette broke at 330 lb., as compared with the German highest 333 lb., and their lowest 94¾ lb.

The cement in my testing room is all gauged in a machine which allows of the minimum amount of water being used, and which greatly expedites the process, but it is rammed into the moulds by hand, the moulds being formed in nests of five, and the strain is applied to the briquette when being tested at the uniform rate of 100 lb. per fifteen seconds, *i.e.*, 400 lb. per minute.

With respect to the matter of adulteration, which it seems our neighbours think it necessary to allude to, I should like to say that I have never yet met with an adulterated sample of English cement.

HENRY FAIJA, M. Inst. C.E.
4, *Great Queen-street, Westminster,*
January 11, 1887.

Tunbridge Wells.—It is proposed to build a campanile and form a reading-room to St. Augustine's Church, Tunbridge Wells. Mr. Brett A. Elphicke, architect, is preparing the design.

TAXATION OF CHIMNEYS AND SMOKE PURIFICATION.

SIR,—A few years ago a paragraph in the newspapers gave an account of a new system of smoke purification which had been adopted at a factory in one of the North of England manufacturing towns. The method of treatment was to conduct the smoke into a chamber, where revolving paddle-wheels dipping slightly under the surface of water in a tank threw up a constant cloud of spray, which washed all the impurities out of the smoke, the spent air from the furnace then passing up the flue in the usual manner. The report affirmed that the purification was entirely successful, did not cost much, and hinted at a saleable product from the "lamp black" washed out of the smoke. Reports of new ventures of this kind are apt to be optimistic, but assuming a fair measure of success in this attempt to deal with the smoke nuisance, we might reasonably have expected to have heard more about it. Possibly it was nobody's business to make the matter known, and no special economy to manufacturers generally to adopt the system. The general advantage of a purer atmosphere does not count much with the average smoke-producer, as against his personal trouble and expense in preventing impurities. Hitherto the attempt to secure purer air in towns has taken the shape of an appeal to the smoke-producer to reduce his coal account by "smoke-consuming" grates and furnaces which give the greatest possible heat with the smallest amount of smoke. This has not been successful. The smoke nuisance is worse than ever. The great increase of the "block" system of houses, both for residences and offices, all over London, is one reason for increased smoke. The domestic fire is not smokeless. The tall "model" dwellings and "mansions," or "chambers," where every two or three rooms are a separate household, usually mean about three times the number of fires and smoky chimneys to the same superficial space as compared with the smaller houses of former years. Practically very little, if anything, can be done by means of improved fireplaces to prevent smoke. There remains the alternative to wash the smoke, as has been suggested above. Smoke purification is now much more practicable than formerly. The very increase of block dwellings that has caused an increase in the smoke nuisance makes smoke purification comparatively easy. The roofs are mostly flat, and their numerous chimneys are close together. Some hundreds of chimneys could easily be conducted into one central smoke-chamber on the roof and purified. In the same way those streets of houses all wall to wall, and exactly the same height, would be treated. In the case of the factory referred to it was found that the purifying paddle-wheels could be made to regulate the draught at the furnace. In applying the purifier to domestic blocks and hotels, therefore, its good effects would be useful in preventing smoke in the rooms as well as smuts in the streets.

The next question that arises is how are people to be made to purify their smoke? To secure the public benefit of a cleanly atmosphere it is out of place to try and get it indirectly by a bribe of a smaller bill for coals. The public, as represented by the the authorities, have no concern with the amount, large or small, of any one's coal account. They are concerned with civic comfort and cleanliness. It is not the creation of smoke in a fireplace, but its liberation into the air, that has to be taken notice of. The best notice to take of it is simply to tax every smoky chimney; that is, every chimney, domestic or manufacturing, that simply conducts the smoke from the fire and delivers it into the air without purification. Some standard of purity must be determined upon. To do this, as well as for the general purposes of legislation on the subject, a number of experiments must be made to ascertain the conditions under which a general smoke purification is reasonably possible. Perhaps this initial work may have to be done by some unofficial body, such as the National Health Society. It might even be worth while for some enterprising landlord or "Dwellings Company" to do it as an inducement to tenants. They could then tempt tenants with the offer of "splendid roof gardens and skittle grounds; no smoke; special facilities for children's playgrounds, and the cleanly drying of clothes." In any case it must be demonstrated that a general purification of smoke is fairly practicable. Then tax every smoky chimney and grant exemption to all who purify their smoke up to a required standard. The tax should be heavy enough to make purification and consequent exemption the preferable alternative. The sum need not be much per fireplace or chimney to secure this. The result would likely be the gradual adoption of purification by all hotels, Dwellings Companies, and large owners of house property in general, with great advantage to the cleanliness of city life.

D. McE.

"SANITARY INSTITUTE OF GREAT BRITAIN EXAMINATIONS."

SIR,—I think your correspondent, "J. A. A.," in your issue of the 8th inst. [p. 100], attaches altogether too much value to the certificates, or "diplomas," of the Sanitary Institute of Great Britain when he imagines that local authorities, in the choice of a surveyor, would be likely to be influenced by the candidate being possessed of one, or otherwise. There are probably few local authorities in the country who know anything about that body, if they have as much as heard of its existence; and when they find that a certificate of "competency to perform the duties of a local surveyor" is awarded, as "J. A. A." so aptly remarks, to "any young man who possesses, as evidenced solely by his answers to a given number of questions, a fair knowledge of municipal law and sanitary engineering, as extracted from books, ... notwithstanding the absence of proof, or, may be, with proof to the contrary, of even a day's experience in the actual work of a surveyor's office," and that "he may be unable to use a level or theodolite, make a survey, or get out a drawing, may never have seen a sewer laid, nor appreciate the importance of 'grit' in mortar"; in fact, in office parlance, not know how to draw to a straight line; utterly ignorant of the preparation of specifications, estimates, and reports, measuring-up and valuation of works, maintenance of highways, keeping accounts, and the every-day routine of a surveyor's office, saying nothing of such things as arbitrations and provisional orders,—local authorities are not likely to treat such certificates with much consideration; and the bare fact that of about 1,000 Borough and Local Board Surveyors in England and Wales, not more than about a dozen possess the certificate of the Sanitary Institute speaks for the little importance with which they are regarded by the profession.

A person otherwise competent to act as local surveyor would have little difficulty in satisfactorily answering the few comparatively simple questions prescribed by the Sanitary Institute, while, on the other hand, a person holding their certificate, if not otherwise qualified, would be quite incompetent to undertake the duties of an office.

That the granting of such certificates is likely to be productive of some mischief, however, there can be little doubt, as the way in which they are so readily obtainable cannot but tend to facilitate the admission to public offices of incompetent persons, who do not hesitate, whenever a vacancy occurs, to become competitors along with legitimate candidates, as many of us are already painfully aware, and with whom, on account of their being in a position to accept appointments at low salaries, men who have received a professional training frequently cannot compete. Nor is it to be expected that gentlemen who have been regularly articled in the offices of civil engineers, and gone through the whole course of a professional training, would submit to the anomaly of being technically examined by an amateur society.

It would be not a little interesting to know what are "the obligations which the profession, and especially the younger members thereof, owe to the Sanitary Institute," the constitution of whose Examining Board is, in the opinion of your correspondent, "a sufficient indication of the high-class nature of the examinations"; and when the Sanitary Institute became "a semi-official body of great repute."

"J. A. A." must have overlooked the fact that voluntary examinations are held periodically by the Association of Municipal and Sanitary Engineers and Surveyors, whose Committee of Examiners are exclusively professional men, holding some of the most important public appointments in the kingdom, and who

are themselves authorities on municipal and sanitary engineering.

ROBERT S. SCOTT, C.E.

Ventnor Club, Isle of Wight,
12th January, 1887.

SIR,—May I plead, through the medium of the *Builder*, that the suggestion of "J. A. A." in your issue of the 8th inst. be not adopted by the Board of Examiners. On p. 18 of the handbook issued by the Council under the heading of "Objects of the Institute, Rules, &c.," we read the following:—"To examine and to grant certificates of competence to local surveyors and inspectors of nuisances, and to persons desirous of becoming such, or of obtaining the certificate." From this, I think, it is quite clear that the certificate is intended not only to be used in an official capacity, but also in private practice, as in the event of a sanitary engineer wishing to obtain the certificate, and succeeding, he would then be designated as "Certificated by the Sanitary Institute of Great Britain," as provided in their rules above referred to. Surely this would be an advantage in private practice.

I have been in a surveyor's office for some years, and hope some day to gain the Local Surveyor's Certificate; but my plea is that any man working hard in qualifying himself to pass the examiners may still be able to obtain the Certificate without regard to his present position. I would respectfully suggest in answer to "J. A. A.'s" objections that when the *viva-voce* examination is taking place, a level might be at hand, and the candidate questioned upon it; the practical experience of the examiners would soon be satisfied as to whether or not he had ever used one. The candidate might also be called upon to produce drawings of sections he had taken, and of surveys he had made and plotted. R.

HISTORIC CITY BUILDINGS.

SIR,—Those of your readers who are interested in the preservation of memorials of demolished buildings having historical associations may be glad to know that, as architect for the new warehouses on the former site of St. Matthew's Church, Friday-street, Cheapside, I have placed the following inscription upon one of the pilasters:—

"The site of these buildings was formerly occupied by the Parish Church of St. Matthew, Friday-day-street, founded before the year 1322, destroyed by the Fire of London, 1666; rebuilt by Sir Christopher Wren, and taken down in 1885, when the parish was united with that of St. Vedast, Foster-lane."

I may also add that, as architect for the six warehouses occupying the larger portion of the former site of St. Paul's School in St. Paul's Churchyard, I am arranging for the erection of a small tablet, in the centre feature, bearing the following inscription:—

"On this site, A.D. 1512 to A.D. 1884, stood St. Paul's School, founded by Dr. John Colet, Dean of St. Paul's." DELISSA JOSEPH.

CLASS OF MASONRY, CITY AND GUILDS TECHNICAL INSTITUTE.

SIR,—As the large class of masonry will soon be engaged on exercises requiring some amount of knowledge in descriptive geometry, I advise students who intend to join the class, as well as the present members, to study, in the "Student's Column" of the *Builder*, year 1885, the following figures:—175, 165 (Sept. 19, Oct. 3); 11, 12, 13, 14, 15, 16, 17, 18, 19 (Feb. 28); 30, 31, 32, 33 (March 14); 36, 37, 36, 39, 40 (March 21); 99, 102 (June 13); 105, 107 (June 20); 123 (July 18).

The two first figures are examples of the general method for finding the intersection of any two surfaces. It may be summed up as follows:—There are certain surfaces, the intersections of which are known, such as planes, spheres, cones, &c., under certain conditions. These must be mastered by the mason as his multiplication table. Then, to find the intersection of two surfaces, we cut them by a third, the intersections of which with each of the two surfaces given are readily known. The points where these intersections meet belong to the intersection of the two surfaces given.

The above is the method of finding intersections of surfaces, on which the whole art of masonry rests; all the other figures indicated are applications of this method to special cases.

The next meeting of the large class of masonry will take place, Tuesday, the 25th inst. in the Examination Hall on the upper floor of the City and Guilds of London Central Institute, South Kensington. LAWRENCE HARVEY,
Director of the Class of Masonry.

COLONIAL.

SIR,—I should be very much obliged if any reader of the *Builder* could give me any information about Colonial architects' associations. Are there such associations? If so have they any office here to which I could write for information?

ARCHITECT'S ASSISTANT.

"MASONS' WAGES."

SIR,—Although reluctant to answer the question of your correspondent "A. B." in your last [p. 132], I feel it a duty to state, in the interest of our trade and the men so unmercifully dealt with in this case, that such was a fact. Such information will, I am sure, be received by your readers with astonishment and disgust, when so many of our fellow men are at this moment begging for employment. It is heart-rending, I can assure you, sir, to those in the position of engaging our skilled and unskilled workmen to hear the pitiable truths related of suffering and want occasioned by this lack of work, the earnest desire and endeavour of men to obtain even the means of existence. What must we think of this cruel demand made by the enemy of our trade, our independence, and our very livelihood at such a time as this? God forbid that any injustice should be used by employers at this critical period of depression towards our working-classes. But, I ask, how many hundreds free from the lash of the Society Union would and are eager at this very moment to supply the void occasioned through the black-balling of these men, whose only fault was their fortunate and happy lot of being able to provide the means of sustenance for their wives and families?

A. B. & C.

CHURCH-BUILDING NEWS.

Burley.—The parish church of St. John the Baptist, Burley, Hants, was reopened on Christmas Day, after enlargement. Built fifty years ago, it is described by the *Hampshire Independent* as a bad example of the debased church architecture and faulty work then so prevalent. As originally built, it consisted of a nave only, no chancel, no vestry, no accommodation for a choir, no arrangement for warming the building. Moreover, it was in a very dilapidated condition when the present vicar entered upon his duties last Easter. The vicar at once moved in the matter, and the following works were found to be necessary:—1, the erection of a chancel to comprise choir sanctuary, and of a small south transept for harmonium or organ; 2, a vestry; 3, new porch in the door to the north; 4, an efficient heating apparatus; 5, partial re-flooring with tiles, and entire re-seating; and 6, general repairs of the structure. Mr. Butterfield was consulted, and under his supervision these works have been carried out, at a cost of about 1,500*l.*

Cannes.—The *Morning Post* of the 29th ult. contains a letter from a correspondent at Cannes describing the Memorial Church there. He writes:—"High up among the trees which cover the heights of California, and overlook the Isle of St. Marguerite, is to be seen an unfinished column which stands in front of the villa in which the Duke of Albany breathed his last. When finished, this is to be crowned by the figure of St. George; and a little lower down, by the road which leads to the large hotel (Californie), a church spire, not yet completed, calls the attention of the traveller to one of the most pertect specimens of English Church architecture in France. It is the Memorial Church which is being erected among the English villas which circle around the winding road, and are hidden among the trees and gardens of the English retreat. The church is practically complete, except for the internal fittings, and Mr. William Conradi, an old pupil of Sir Gilbert Scott, and Mr. Blomfield's deputy, having ascertained what my intentions were, gave me permission to enter, and acted as my *cicerone*. The church is from the designs of Mr. A. W. Blomfield, and every portion of the interior ornamental work is sent out from England, and has been executed under his personal supervision. The builder is Mr. George Russell, of Cannes, and the stone employed is from the neighbourhood of Grasse, and, for the first time, this stone has been polished, and used for purposes of ornamentation as well as for the rougher work of building."

Dingley.—The little Church of All Saints, Dingley, has recently been reopened after what the *Northampton Herald* describes as "complete restoration" of the exterior and interior. The amount of the contract for the restoration was between 2,000*l.* and 3,000*l.*, and the expense has been generously borne by Lord and Lady Downe, the rector (Rev. H. B. Upcher), and others. The work was entrusted to Messrs. Cornish & Gaymer, of North Walsham, and it has been carried out under the superintendence of Mr. J. Bell. The high-backed pews have been superseded by modern chairs of unvarnished beech, which stand on a floor composed of pitch-pine blocks, and the aisles are relaid with stone. New bases have been added to the pillars, which have been pieced and restored. The walls have received a new coat of plaster, and new braces to the principals of the beams have been put in, and new rafters where required. The chancel is paved with Derbyshire stone, and the Griffin Chapel on the right of this with oak blocks. The chancel and chapel roofs are quite new, the former being a copy of the original design, and the latter being panelled. Half of the chapel will in future be used as a vestry, and will be partitioned off by means of curtains. Externally, the porch has been restored, and new roofs of Colley-Weston slates put on both chancel and chapel. The walls have been pointed where required, and a channel dug round the chancel and nave (which are below the adjoining soil) in order to prevent damp.

Holme-next-the-Sea.—The restoration of the chancel of St. Mary's Church has just been completed through the exertions of the vicar and churchwardens, assisted by Mrs. Nelson, senior, who has been most energetic in getting up concerts and other entertainments in aid of the funds. Mr. Le Strange, the patron of the living, has subscribed very liberally. It is proposed to re-seat and complete the restoration of the nave in the spring, which was left unfinished about two years ago for the want of money. The works in the chancel have been carried out by Mr. Ducker, of Lynn, under the direction of Mr. Wm. Adams, architect, of King's Lynn.

Irchester.—At the annual meeting of the Architectural Society for the Archdeaconries of Northampton and Oakham, held recently, plans for the restoration of Irchester Church, prepared by Mr. Pearson, were laid before the committee and approved. It is stated that the restoration "is to be carried out in a thorough manner." The chancel will be restored by Lord and Lady Wantage.

London.—At Christ Church, Lancaster Gate, a new baptistery, the gift of a member of the congregation, has been formed under one end of the south gallery, by adding an extra granite shaft. The stone capitals have been removed, and new carved ones substituted, with angels on the inside portion. These support the moulded stone ribs above, which terminate in a carved boss in the centre. The roof-panels are fitted with emblems in Venetian glass mosaic, representing various Christian symbols, and on the back wall is a panel of Christ blessing little Children, in glass mosaic, with gold ground. The mosaics have been executed in Venice, by Dr. Salviati. In the centre of the baptistery stands the font, which is of alabaster and marble. The lower step is of Purbeck marble. Above this is a base of rouge royal, which supports a model base of Ipplepen. The centre is of grey Devon, and is surrounded with green marble shafts. These support a bowl, which is in light alabaster, of octagonal form, with carved cornice on top. The panels are inlaid in marble, in floral and geometrical designs,—the rose, lily, passion-flower, vine, and wheat being all represented. The basin is of polished Carrara marble. On two sides a metal screen, picked out in gold, is fixed, and the floor enclosing the lower step is in ceramic mosaic. The work has been designed and carried out by Messrs. Underwood & Sons, Duke-street, Grosvenor-square, who have also made the new pulpit, which is the gift of Lady Brabazon, and is composed entirely of alabaster and marble, highly polished. It is of sexagonal form, with winding stairs.

Northampton.—The structural alterations to the interior of the Church of the Holy Sepulchre are now completed. An organ-chamber, choir-vestry, and an enlarged clergy-vestry have been added to the church. The additional buildings have been carried out in precisely the same style as former renovations, and are strictly in keeping with the other portions of the church. The plans for the alterations were prepared by Mr. Townsend, the diocesan surveyor, and have been carried out by Mr. Reynolds, builder and contractor, of Margaret-street. The tender for the vestry and organ-chamber was 375*l.*, but this amount does not represent the whole of the outlay on the interior. Mr. R. Lee Bevan, of Brixworth, has intimated his intention to place a stained-glass window in the church to the memory of his deceased wife.

Petrockstow (*North Devon*).—On Christmas Eve a memorial reredos was unveiled in the parish church of St. Petrock. It has been executed by Mr. Harry Hems, of Exeter, from a design by Mr. Horace L. Field, architect,

London. It is of oak. The five main panels are filled with carved figures.

Ruddington.—There is a scheme on foot for building a new church in Ruddington, on the site of the present incovenient structure. Nearly 4,000*l.* have already been subscribed, and plans are being prepared.

The Student's Column.

FIELD WORK AND INSTRUMENTS.—IV.

Surveying Instruments.

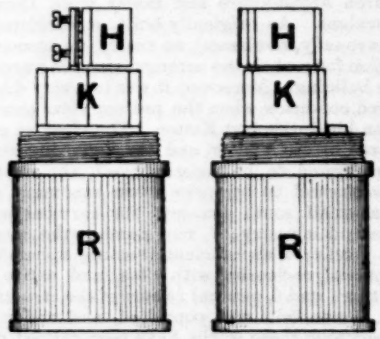
III.—THE BOX SEXTANT (*continued*).

THE mathematical proof given upon the plate showing figs. 1 to 5 of our last article (see pages 134, 135, *ante*) will be seen to depend chiefly upon the facts stated at the commencement of that article, and upon the principles enunciated in Euclid, that the exterior angle of a triangle is equal to the two interior and opposite angles, also that when two straight lines cut one another, the opposite angles contained by those lines are equal. Thus, we prove that the angle, A E B, is double the angle, A F B. Now, if the mirror at A be placed parallel to the mirror at B, the angle M A F will equal the angle A F B, and, therefore, the angle A E B will be double the angle M A F. Hence, if the vernier stand at zero upon the plate shown in fig. 3, when the mirrors are parallel to one another, the angle at E will be double the angle over which the revolving mirror will travel. Fig. 1 supposes a case in which this angle is 52½ degrees, and hence the vernier in fig. 3 reads 105 degrees. The angle thus indicated in fig. 3 is not exactly vertically over that in fig. 1, but is made to depend upon it, the graduated silver arc being fixed in the most convenient position upon the top plate for recording the angles. A small magnifying glass is attached, as shown in fig. 3, which glass can be raised or lowered to suit the eyesight, enabling the subdivisions upon the vernier to be clearly defined. The surveyor selects the line which comes on his left hand when about to take an angle between two given directions, or to set out an angle in a required direction, and holds the instrument in his right hand by the box which has been screwed on to its underside after lowering the darkening glasses by means of the side levers as described in our last article. He then observes a pole marked D in figure 1 through the unsilvered portion of the glass marked B, and with his left hand he turns the milled screw R until the pole marked C upon his right hand is reflected from the mirror at A to the silvered portion of the mirror at B. When these two poles appear in line one over the other in the glass B, as shown in fig. 2, the desired angle is obtained and read off the upper plate; or, when the angle is given, the surveyor directs his assistant to move the pole C right or left as required until set out to the given angle, as will be proved by the coincidence of the poles in the glass at B. To observe the pole D the instrument is moved slowly by the right hand until its face is in the plane passing through the eye and the two objects between which the angular distance is being taken. When, therefore, altitudes are to be observed, the instrument is held in a vertical plane; when horizontal or oblique angles are to be measured it is held in a horizontal or oblique plane. Unless the objects lie in the same horizontal or vertical plane its use for surveying purposes, where horizontal or vertical angles are alone required, can only be approximate. To ensure accuracy in the position in which the instrument is held the same precaution as to the use of double poles or ranging rods in a line, is necessary to be observed, as was explained in our article upon the optical square. This will be clear upon reference to figure 10. The adjustments of the mirror are effected by the key marked K in fig. 3, which, for safety, is screwed into the top plate, as shown in section in fig. 4. These adjustments are usually made by the manufacturer, and when once effected seldom need repetition, but may be tested by the surveyor in the following manner. As shown in fig. 6 a distant object is observed with the vernier set to zero. If the sun be that object then the reflected image of the lower part of the sun will or can be made to appear vertically in line with the upper part of the sun by means of the key K slowly turning the bar L in the side of the instrument fig. 1, which acts upon the spring connexion shown in fig. 2. By this means the two mirrors are placed horizontally parallel; then by turning the instrument on its side and repeating the operation, but this time placing the key K in the spindle marked near B in the top plate (fig. 3), the mirrors can be set also vertically parallel. With constant use the mirrors will after some time get very dirty. The best way to clean them is by the use of a small light brush.

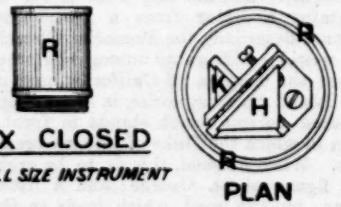
The parallelism of the line of the sight in the telescope to the plane of the instrument is tested by placing the index glass so as to produce the apparent coincidence of two distinct objects whose directions make an angle of 90 degrees or thereabouts, and observing whether any slight motion of the plane of the sextant about an axis traversing the object seen by reflection disturbs the apparent coincidence. If the adjustment of the telescope is correct, no such disturbing influence should appear. We have mentioned this adjustment of the telescope to complete the subject, but as in ordinary land surveying the telescope is dispensed with, its accuracy when supplied by reliable makers can be trusted, and it is only necessary for the surveyor to test the adjustments described by fig. 6. For further explanation we must refer our readers to the notes upon the plates shown in our last article (pages 134 and 135).

IV.—THE LINE RANGER.

This instrument, the use of which is explained in our illustration, enables the surveyor to find



LINE RANGER—LARGE SIZE



BOX CLOSED

SMALL SIZE INSTRUMENT

PLAN

NOTE

THIS INSTRUMENT IS USED AS A LINE RANGER FOR DETERMINING THE POSITION OF ANY INTERMEDIATE POINT

A——B

C IN A LINE AB THE POLE ON THE LEFT HAND BEING REFLECTED IN THE LOWER PRISM & THE POLE ON THE RIGHT HAND REFLECTED OVER IT IN THE UPPER PRISM.——

an intermediate station upon a given base line, and is useful where great accuracy in the determination of any required point in a line is essential.

The Paving, Lighting, and Cleansing of the City.—The accounts of the Commissioners of Sewers for the last year have just been issued. The cost of paving the streets was 28,987*l.*; lighting, 13,422*l.*; cleansing and watering, 39,638*l.*; sanitary works, 3,070*l.*; legal and parliamentary expenses, 2,361*l.*; contractors and artificers, 4,749*l.*; stoneyard, 4,972*l.*; collectors' commission, 5,705*l.*; officers' salaries, 9,347*l.* The Commission paid during the year, for interest on moneys borrowed, 64,824*l.*; and to the School Board for London, 138,263*l.*—*City Press.*

Books.

Vauban; Montalembert; Carnot: Engineer Studies. By E. M. LLOYD, Major R.E. London: Chapman & Hall. 1887.

THIS is a very interesting handbook of the lives of three eminent military engineers, preceded by an introduction giving a brief sketch or outline of the general history of fortification, the growing power of artillery, and the modifications of construction to which its employment and improvement gave rise. In the course of this the author notes the prevalence in the sixteenth century of what may be called the "draughtsman engineer," when the thing became a kind of fashionable profession, and, as a contemporary critic observed,—"Sundry persons being able to make the draught or portraiture of a thing, give themselves to the making of plates of fortresses without number, not understanding or knowing how to proceed nor to discourse from the foundations of the matter with lively reasons"; a kind of thing that has happened in other professions time and again. It is curious to find that about this time, or at the beginning of the seventeenth century, the work of making the lines of approach to a besieged town was almost purely a matter of money, being contracted for and paid for in proportion to the danger and probable loss of life. Hence "Hexham recommends the besieged to use their cannon freely against the approaches, for then the enemy must either raise the siege or it will cost them dear, because no men will undertake the work but such as will be soundly paid for it."

The life and character of Vauban are graphically sketched; and whatever moralists may think of the business in which he was engaged and the merits of the combatants he worked for, there was no doubt that he both thoroughly understood his business, and was ready to expose life and limb in its prosecution, without regard to his own safety or comfort. Indeed, it seems to have been thought necessary at last to endeavour to keep some kind of control over him, and keep him out of danger, as too valuable a possession to be lost.

Vauban's special merit, besides his close attention to details of an attack, was that "he was the first engineer who considered fortresses collectively as units in a general scheme of defence." The special principles of attack and defence favoured by the three men who are the chief subjects of the book are clearly stated, and the volume closes with a short essay on "modern forts," showing how the modern adoption of "extended order" in the line of men in battle has also, under the influence of modern long-range fire, been adopted in fortification. The book, we presume, is addressed to the general rather than the military reader, and is of interest in this light as giving, under the guise of a biographical treatise, a good deal of information as to the nature of the problem of fortification and attack in past and present times.

How I managed my Estate. London: George Bell & Sons. 1886.

THIS very pleasant and readable little book, containing many suggestions and much good sense, is a reprint, we perceive, from the *St. James's Gazette*. The author's practical claims to be listened to on the subject are set forth in the first paragraph. He gave 14,000*l.* for an estate in Sussex; farmed and managed the lands almost entirely himself; sold a thousand pounds' worth of timber; spent about 5,500*l.* on improving house and land; and, within fifteen years, parted with the place, which he had "made too grand for him," for 27,000*l.*,—the whole transaction leaving him 9,500*l.* richer in money, as well as in a great deal of pleasant experience and country knowledge. The experience of any one who had made such a practical success must be worth having. The heads under which this experience is given are "Choice of an Estate," "Underwoods," "Timber," "Building and Quarrying," "Making Grounds," "Farming and Shooting," &c. In the chapter on "Building and Quarrying," however, the author does not explain to us why newly-faced walls should have involved a new roof, or why a new roof involved "new walls right through the middle of the house in order to support it." This is the sort of nonsense that gets written in daily papers by people who think it clever to laugh at the architect who told them it would only cost so much,

and then do without him and find themselves running into all kinds of expense which he might have shown them how to avoid. Some shrewd remarks about labour occur in this chapter. The London workmen, who received 8s. a day seemed, he says, to have a certain standard of their own as to the amount of work which might be turned out, and "the country masons who received half that sum, and when alone did twice the work, seemed under some tacit compulsion not to do more than their fellows did, so long as they worked with them, so that 18s. a square of walling before the London men came, cost about 3*l.* during their stay, though it fell again to the lower rate as soon as the country workmen laboured by themselves." This is telling, but, we suspect, exaggerated. A device by which he saved 300*l.*, the writer tells us, was that of having the dams of a series of fishponds puddled by horses instead of men; "I found that one heavy horse would do the work of ten or twelve men, and a great deal better, the weight of his hoof being vastly more powerful than the stroke of the usual puddling-rod." All horses, however, may not be equally manageable in this way. "One man may bring a horse to the clay, but twenty cannot make him puddle"; and, query, does it improve the horse to be paddling about in wet, stiff clay for many hours together?

We are interested to notice in the chapter on watering grounds, that the author, in laying out his lawn, applied the practice of the Greek architects, as discovered by Mr. Penrose (to whose work he refers), laying out the lawn with an almost imperceptible rise in the centre, and which was much more satisfactory to the eye (as we can well believe) than a perfectly level turf.

The Conversion of English Timber (*Timber Trade Handbooks. No.* 1). London: *Timber Trades' Journal* Office.

A VERY useful little treatise on the methods of cutting up and clearing timber for use, on things to be sought and things to be avoided. Young architects would do wisely to possess themselves of it; they will get a good many practical hints in a small compass.

Model Dwelling-Houses. With a Description of the Model Tenement erected within the Ground of the International Exhibition, Edinburgh, 1886. By SIR JAMES GOWANS, Architect, Lord Dean of Guild of the City of Edinburgh. Edinburgh: T. A. Constable & Co.

THIS is mainly a description of a block of "flat" tenements erected in the grounds of the Edinburgh Exhibition by the joint and gratuitous efforts of architects, engineers, manufacturers, and artificers. The idea was a good one, and has been well carried out. The author prefaces his description by a few remarks on the history of the typical Scottish flatted tenements, and some not undeserved strictures on their insanitary condition. His object is to show that they may be improved in plan and construction, and be at once healthy and remunerative, and such as should, he thinks, be built in the suburbs of large towns, for the accommodation of the working classes. The plan is very convenient and complete, and the construction quite in accord with the latest lights on the subject. We find little or nothing to criticise, except, perhaps, the extreme smallness of the third bedroom, which has a cubic capacity of only 567 ft. It would be in all probability occupied by more than one person, and even if they were children, and although there is a fireplace in the room, it is not enough for a "model" dwelling.

In the case before us the building is only two stories in height, and has light and air on all sides. It would have been more generally useful if Sir James Gowans had shown by plans and diagrams how the lofty street tenement with its narrow frontage could be brought into something like a sanitary condition, and to this task we hope he will on a future occasion address himself. As at present built, "the central staircase, with no well in the centre, surrounded on all sides by rooms, unlighted by side windows, reminds one more of a vault than anything else." The high feu duty is of course the root of the evil, and one which is not likely, we fear, to be soon destroyed. From the peculiar circumstances attending the erection of the block of buildings illustrated, its cost cannot be given, and although cost is of the essence of the problem, Sir James Gowans does not touch upon it. The book is an interesting record of a practical experiment in tenement building; it is well written, illustrated, and printed.

Horticultural Buildings: Their Construction, Heating, Interior Fittings, &c. With Remarks on some of the Principles involved, and their Applications. With 123 illustrations. By F. A. FAWKES. New edition. London: Swan, Sonnenschein, Le Bas, & Lowry.

THE author of this useful little book covers an astonishing amount of ground, ranging from astronomy and solar physics to the Metropolitan Building Act, and the familiar analysis of a rod of brickwork. Much of the information has been collected from well-known sources, but much is original, and based upon personal experience, and all is useful. The author recommends the old-fashioned putty glazing for horticultural buildings, and the old-fashioned system of heating with hot water at low pressure, and this after reviewing all modern substitutes for both. We find ourselves in accord with almost all his views, and especially agree with him that architects have too much neglected the design of the class of structures of which he treats, and that therefore the purely horticultural interest has prevailed over what he aptly calls the horto-architectural,"—a new word, for which we thank him. He writes with enthusiasm, as all authors worthy of the name should write, and endeavours to press home the high importance of his subject by the following amazing syllogism:—"Contact with, and a proper contemplation of, God's works has a refining influence on mankind. A greenhouse enables both contact and contemplation to be intensified. Therefore, a person cannot but be ennobled who thoroughly appreciates and properly uses a greenhouse. Upon social, hygienic, moral, and even religious grounds, horticultural buildings may justly claim advantages of a solid and superior character!"

We cannot agree that the summer-house which is figured at p. 100, and looks like a cabman's shelter, is all that the author claims for it on the score of beauty, and prefer the "usual rustic thatched" affair, insects notwithstanding. But, horto-architecture apart, we can honestly recommend this little book for its practical wisdom and vast store of useful information.

The Art of Architectural Modelling in Paper. By T. A. RICHARDSON, Architect. London: Crosby Lockwood & Co.

THE very book for the amateur modeller of architectural subjects, containing wise cautions as to the true principles of the art, and warnings against the temptations which beset the inexperienced modeller to give his work the character of a mere toy. We are not sure the author goes quite far enough in this direction, and doubt whether the trees made of gummed twigs covered with moss, and flowerbeds of cork, burned to give the appearance of rich mould, and diversified with moss and bits of scarlet paper, do not verge on the toy-like. The architectural subjects selected for illustration and experiment are simple and suitable, and the instructions are conveyed with clearness and precision.

Practical House Decoration: A Guide to the Art of Ornamental Painting, &c. With some Remarks upon the Nature and Properties of Pigments. By JAMES WILLIAM FACEY. London: Crosby Lockwood & Co.

THIS is evidently written by one who has some acquaintance with the practical side of the subject, and only falls short of the desirable standard on the side of art. The illustrations show how not to do it, and are anything but satisfactory. If it be true, as the author says of fig. 8, that arrangements of the kind are often "adopted in the quaint mansions which are so rapidly increasing in the fashionable quarters of the metropolis," all we can say is we are sorry for it. The example of "ecclesiastical ornament" given is grotesque, and the "grotesque" simply shocking. The book is not to be recommended as a guide in matters of design; but it may be consulted on practical questions; although we take exception to the directions for the preparation of "ivory white" with burnt sienna,—yellow ochre being, in our opinion, by far the more suitable pigment, and, indeed, the only suitable one.

Constructive Geometry of Plane Curves. With numerous Examples. By T. H. EAGLES, M.A., London: Macmillan & Co.

WITH so vast an accumulation of text-books on geometry, it might be supposed that within the ordinary bounds of study nothing new remains to be placed before the student, but the author of this work is amply justified, both by his matter and method, for adding one more to the number. Perhaps in no subject more than in geometry has evolution been harder at work during recent years, and, as a natural consequence, the text-books of our earlier days have to be discarded for their newer rivals. We now demand more conciseness in our analytical work and a better adaptation to practical purposes of our geometrical methods. The main feature of this volume is the systematic treatment and actual delineation from given data of some of the more important straight-line figures, together with various plane curves, as the circle, parabola, ellipse, hyperbola, and all the useful miscellaneous curves, such as the cycloid, catenary, tractory, &c. As a compendium of the subject it will be found of considerable value to the scientific draughtsman, and to the candidates for honours at South Kensington it should be almost indispensable. The extensive use of graphic methods in the present day has greatly tended to popularise the use of such books, but some of them unfortunately presuppose a distinctly mathematical education, and have consequently a chilling effect upon the ordinary mind. In the present work the construction of the problems is as clearly elucidated as in any of the simple introductory text-books to practical geometry, while the proof follows for those who desire to master it. The concluding chapter upon the graphic solution of equations will be found both useful and interesting, as showing the possibilities of the method when applied to ordinary requirements.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

2,070, Cowls or Caps. J. Watson.

The cowls made in accordance with this invention are constructed with two or more concentric cylinders. The two cylinders are both supported by and fixed to an annular plate, the plate being supported by the flue to which it is applied, and the central opening in the annular plate is made to fit that of the flue. Vertical plates divide the cylinders, and the inner cylinder has a number of perforations to permit the rising air from the flue to gain access to the annular spaces between the cylinders. Where necessary, the cylinders are stayed and strengthened, and are finished off with a suitable ornamental cover.

2,199, Closet-Basin Joints. W. H. Tylor and W. B. H. Drayson.

This improved joint is applicable to all sorts of metallic sanitary jointing, and to water connexions. The kind of joints in general use for such purposes are usually made by cementing the lower or outlet part of the basin into the socket or outlet box. This, however, is unsatisfactory, as the cement is liable to become disintegrated and loose. A self-adjusting split-ring is therefore used in this invention, and rings of india-rubber or other compressible material are used to make the joint tight and compact.

2,399, Mixing Concrete. H. Faija.

According to this invention, in place of passing the materials in a continuous manner to the mixing vessel, they are fed in separate and distinct portions, and are taken up by rotary stirrers, so arranged as to give the maximum of mixing. A compound movement of these stirrers effects a thorough admixture of the materials.

4,224, Ornamenting Panels, &c. A. E. Ryles.

The process which is the subject of this invention somewhat resembles the process of marbling paper. Into a shallow trough is put water in which is dissolved size, glue, or glycerine. On this is dropped or sprayed the colours that are to appear on the ornamental object. These colours spread out in views and shades; when they are too thick they may be thinned by blowing on them, or if this is insufficient the thick parts may be touched with a brush holding a little turpentine, and then with a feather or light stick. The surface to be ornamented is prepared with a suitable ground colour, and then placed face downwards on the liquid. It is then taken off and dried, when the surface may be flattened with pounded pumice and varnished, and afterwards polished with rotten stone. Several dippings and dryings may be arranged if necessary.

2,310, Pigments. D. Swan.

The object of this invention is to utilise a by-product of galvanising,—proto-chloride of iron. The solution of this substance is mixed with carbonates, and when air is forced into the mixture

it will form a chloride of a yellow or red colour, which is the pigment.

14,434, Decorating Wood. G. Howard.

By this invention, a pattern is cut out of a polished wooden block by means of a sand blast; then the interstices are filled with suitable adhesive stopping, previously coloured as required, the whole surface showing the natural colour of the wood on a ground the colour of the filling. It is then smoothed over. The most delicate and intricate patterns may be reproduced.

NEW APPLICATIONS FOR PATENTS.

Jan. 7.—235, S. Shields, Laying or Fixing Wood-block Floors.—267, J. Gamble, Warming and Ventilating Dwelling-houses, &c.—268, Cabuy and Lamal, Drain Traps.

Jan. 8.—291, E. Phillips, Automatically Sharpening Saws.—296, Francis and Carey, Combined Latch and Bolt for Doors.—315, G. Hardingham, Iron Cement.—325, A Boult, Adjustment of Saw Blades in Saw Mills.

Jan. 10.—366, T. Sterne, Ventilating Rooms or Buildings.—375, E. Sayers, Sash Fastener Securers.—388, A. Beaubais, junior, Automatic Bolt for Double Doors.

Jan. 11.—414, T. Whalley, Water-closets.—424, W. White, Roads and Pavements.—437, J. Thompson, Ventilators and Chimney Cowls.—440, G. Butler, Window Sash Fasteners.—442, J. and S. Stott, Rendering Buildings Fireproof and Waterproof.—456, Underwood and Dobie, Door Locks.

Jan. 12.—480, J. Buckle, Flushing Syphon for Water Closets, Cisterns, &c.

Jan. 13.—538, J. Mitchell, Joiner's Bench, Stop, and Cramp combined.—547, J. Wilesmith, junior, Ornamenting Wooden Panels, &c.—577, P. Justice, Manufacture of Cement.

PROVISIONAL SPECIFICATIONS ACCEPTED.

14,580, H. Perry, Machine for Sizing and Varnishing Paperbangings.—15,233, C. Perrott and Others, Making Tile-Grates with the Tile-frames in one Piece with the Front.—15,815, George Martin, Holdfast for Pipes, &c.—16,294, H. Bassett, Window-sash Fastener.—15,452, F. Crittall, Open Stoves for Warming and Ventilating.—16,526, C. Brasier, Door-locks.—16,637, E. Mileson, Mantel-board.—16,705, A. Clarke Chimney Caps and Ventilators.—16,911, J. Hunter, Signboards.—14,755, T. Dewsberry, Ventilator.—16,007, J. Dedden, Fastenings for Window-sashes.—16,437, T. Malling, Fuel-supplying Apparatus for Fire-grates.—16,480, W. Joy, Manufacture of Portland Cement, &c.—16,752, J. Honeyman, Ventilators.—16,809, E. Hughes, Circular Saw Benches.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

2,630, B. Mills, Electrical Indicators.—3,520, F. Biggs, Locks and Latches.—7,455, J. Kaye, Automatically Latching and Bolting Doors.—1,852, H. Owens, Secure-locking Casement Stays.—4,603, J. Rawlings, Bench Plugs and Cams for Cabinet-makers, &c.—12,333, J. Weatherhead, Making Cowl-heads for Ventilators.—13,730, R. Crane, Water-supply System.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JANUARY 10.

By T. DANN.

Lambeth—230 and 232, Westminster Bridge-road, freehold, area 1,600 feet £3,125

JANUARY 11.

By DEBENHAM, TEWSON, & Co.

Kensal New Town—1 to 7, Great Western Terrace, 43 years, ground-rent 24*l.* 700

By HARMAN BROS.

Clapton—85, Darenth-road, 98 years, ground-rent 10*l.* 640

JANUARY 12.

By MESSRS. GRADY.

Holland Park—44, Clarendon-road, 52 years, ground-rent 12*l.* 10*s.* 690

By C. CURTIS.

West Ham, Margery Park-road—Two plots of freehold land 250

By WILLATS & CHARLTON.

Peckham—Ground-rents of 64*l.* a year, term 70 years 1,080

JANUARY 13.

By GEO. TROLLOPE & SONS.

Chester Square—No. 38, term 36 years, 21*l.* 10*s.* ... 3,300

By C. C. & T. MOORE.

Upper Holloway—49 and 51, Wedmore-street, 23 years, ground-rent 5*l.* 200

MEETINGS.

MONDAY, JANUARY 24.

Royal Academy of Arts (*Lectures in Sculpture*).—Mr. A. S. Murray on "Greek Sculptures Expressive of the Emotions: before Pheidias." 8 p.m.

Surveyors' Institution.—Continued discussion on "The Tithe Question." 8 p.m.

Society of Arts (*Cantor Lectures*).—Dr. Thudichum on "The Diseases of Plants, with special regard to Agriculture and Forestry." I. 8 p.m.

Leeds and Yorkshire Architectural Society.—Sketch Club Exhibition.

TUESDAY, JANUARY 25.

Institution of Civil Engineers.—8 p.m.

Manchester Architectural Association.—Mr. Phythian on "Mr. Ruskin's Writings on Architecture." 7·30 p.m.

WEDNESDAY, JANUARY 26.

Society of Arts.—Mr. J. Traill Taylor on "Photographic Lenses." 8 p.m.

THURSDAY, JANUARY 27.

Royal Academy of Arts (*Lectures in Sculpture*).—Mr. A. S. Murray on "Greek Sculptures Expressive of the Emotions: about the time of Pheidias." 8 p.m.

National Society for Preserving the Memorials of the Dead.—(1) The Rev. W. J. Loftie, F.S.A., on "Epitaphs." (2) Mrs. Danvers Taylor on the "Fetherston Monuments in Stanford-le-Hope Church, Essex," and on the "Tyrell Monuments, in Downham Church, Essex." 4 p.m.

Society of Telegraph-Engineers and Electricians.—Professor Silvanus P. Thomson on "Telephonic Investigations." 8 p.m.

St. Paul's Ecclesiological Society.—Annual Dinner (First Avenue Hotel, 7 p.m.).

Miscellanea.

Lectures on Sculpture and Architecture at the Royal Academy.—The following lectures are announced:—In *Sculpture*: by Mr. A. S. Murray, Keeper of the Greek and Roman Antiquities in the British Museum:—Jan. 24, "Greek Sculptures expressive of the Emotions: before Pheidias"; Jan. 27, Ditto, "about the time of Pheidias"; Jan. 31, Ditto, "after Pheidias." By Professor C. T. Newton:—Feb. 9, "Archaic Greek and Italian Terra-cottas"; Feb. 15, "Terra-cottas of the final period of Greek art"; Feb. 24, "Terra-cottas of the Roman Period." In *Architecture*:—By Professor J. H. Middleton:—Feb. 7, "Methods of Decoration, as applied to Greek Architecture"; Feb. 11, Ditto, "as applied to Roman Architecture"; Feb. 14, Ditto, "as applied to Mediæval English." By Mr. G. Aitchison, A.R.A.:—Feb. 28, "Doorways"; March 3, "Windows"; March 7, "Balustrades."

The Stables of "Olympia."—With reference to the mention made by us a fortnight ago [p. 99] of the opening of the National Agricultural Hall, Kensington, we are asked to mention that the stables of "Olympia," both as regards the stalls and centre promenade, are entirely paved with Candy & Co.'s vitrified Devon buff paving bricks.

The New Exchange Station, Liverpool. Referring to our notice last week (p. 132, *ante*) of the opening of a portion of the New Exchange Station, Liverpool, erected from the designs of Mr. H. Shelmerdine, we are asked to mention that the floors of the hotel and of the cab-approach in connexion therewith have been laid with Mr. R. L. Lowe's patent wood block flooring and pavement respectively.

The Russian Petroleum Industry.—During the last few months several cargoes of Russian petroleum have arrived in Europe, the oil being said to be equal in quality to the American "water-white," whilst at present six steamers are in course of construction in this country for the purpose of carrying on this trade. Every autumn the producers at Baku now hold a conference in order to consider what steps should be taken for improving the industry, especially as regards transport, it being their determination to respond to every demand of the European market, and it will be of interest to watch the competition now in progress between the Russians and Americans. Since 1876 the number of petroleum wells in the Caspian has increased by 300, whilst the annual production of raw oil has risen from 30 million to 575 million gallons. There are in Russia now 136 refineries, which yield annually 125 million gallons of oil. The cisterns for raw oil are capable of containing 60 million gallons, and the iron reservoirs at Tschjornij, Gorodrk, 20 million gallons of refined oil. On the Russian railways there are 1,000 reservoirs, capable of holding 3,000 gallons each. The number of steamers engaged in conveying the oil on the Caspian Sea is thirty, with a tonnage ranging from 250 to 1,000 tons. There are, besides, a number of smaller steamers and sailing vessels engaged in this traffic.

The Archbishop of York and the Churchwardens of St. Mary's, Beverley.—A somewhat acrimonious dispute has been going on for some little time between the Archbishop of York and the Churchwardens of St. Mary's, Beverley, in reference to the seats in the church. The Vicar and Churchwardens having determined that all appropriation should be abolished, notices to that effect were put up in the church. Copies of the notice, with an explanatory letter, were sent by the Wardens to His Grace, who, however, instead of giving the step his approval, told them in reply that by law "their duty was to assign the seats to the parishioners according to their degree"; that, therefore, their notice was "quite illegal," and he must "request and direct that it be withdrawn and cancelled." The Churchwardens, in reply, say:—"If the Wardens are wrong in their view of the law, it is important that their error should be corrected; but if, on the contrary, your Grace's statement of law is wrong, and your claims illegal, it is much more important that error and illegality should be shown. Between the two statements, viz., your Grace's, 'The law is quite clear. The churchwardens are the officers of the bishop of the diocese, and their duty is to assign the seats in the church to the parishioners according to their degree,' and the Wardens', viz., 'The churchwardens are not the officers of the ordinary, but of the parish and Vicar, being appointed by them respectively.' 'The body of every parish church belongs of common right to all the parishioners, and this right cannot lawfully be defeated by any permanent appropriation of particular places' ("Report of House of Lords Committee, 1885," p. 18), lies the gist of this unfortunate disagreement and scandal. As to which is the true one the Wardens have no shadow of doubt." The Vicar seems to have yielded to the Archbishop, but the Churchwardens are obdurate, and seem to challenge the ordeal of legal proceedings.

East India Teak.—Messrs. C. Leary & Co.'s "Annual Circular on Ship-building, Furniture, and other Hard Woods" gives the following statistics for the last three years:—

	1886. Loads.		1885. Loads.		1884. Loads.	
	Timber.	Planks.	Tmbr.	Plnks.	Tmbr.	Plnks.
Imports	16,330	2,181	8,195	2,453	13,515	2,320
Deliveries ...	8,889	2,022	9,078	1,886	9,164	1,466
Stock, Dec. 31	12,938	1,848	5,497	1,689	6,380	1,122

The present stock of timber is composed of 7,866 loads of Moulmein, 2,264 loads of Rangoon, 2,789 loads Bangkok, and 19 loads of other sorts. The course of the market has been unfavourable throughout the year; the very limited demand, and the accumulation of large stocks in this, as in all the other markets of the United Kingdom, having had a very serious influence on values. The depression eventually became so pronounced that importers decided, about June, to make large concessions in prices, in order that their stocks, then in course of increase by further supplies, afloat and loading, should not assume unmanageable proportions. This policy has enabled them to effect extensive sales, and seeing that the quantity now afloat is only 5,395 tons, as compared with 17,180 tons at the beginning of 1886, and that the additional tonnage now under charter is only 11,329 tons, against 16,015 tons at the same date last year, we may fairly expect an improving market. Cargo quotations for Burmah wood have declined from about 13*l.*, at the opening of the year, to from 10*l.* to 10*l.* 10*s.* at its close, Siam wood standing at about 30*s.* per load less.

The Projected Nicaragua Canal.—A report which was recently read at Washington by the Senate Committee relating to the Bill incorporating the Nicaragua Canal has been received with general approval, and has revived public interest in the scheme. According to the report the canal can be constructed for about one-fourth of the estimated cost of that of the Panama Canal. Various estimates have been submitted varying from 75,000,000 dollars (15,000,000*l.*) to 150,000,000 dols. (30,000,000*l.*). The Bill restricts the tolls to a maximum of two dollars fifty cents per ton. It is calculated that the net income from the canal, when completed, will amount to 12,000,000 dols., equal to 8 per cent. on the highest estimated cost. The canal, if executed, will in all probability be ultimately connected by a through railroad with the United States.

The Sahara Lake Scheme.—The old proposal for making the Desert of Sahara an inland lake appears to be again on the *tapis* in France, M. de Lesseps having dwelt on it at a recent meeting of the Academy of Science. It is, however, now proposed, instead of effecting the cutting of the ridge on the Atlantic side previously, to sink artesian wells along the Tunis border on the Sahara and then to found cities, so that by the time the desert had been converted into a lake there would be a population ready to trade upon it. Various other engineering works are then also contemplated. According to M. de Lesseps, this plan has found much support among engineers and others interested in the scheme. It is, however, maintained by some that the scheme is useless, as the lake will be dried up again, and that railways would answer the purpose in view far better.

Liverpool Engineering Society. — The usual fortnightly meeting of this Society was held at the Royal Institution, Colquitt-street, Liverpool, on the 12th inst.; Mr. J. J. Webster, M. Inst. C.E., President, in the chair. A paper by Mr. R. W. Brightmore, M.Sc., entitled "The Flow of Water," was read by the author. The author commenced by pointing out that the present theory of hydrodynamics is only applicable to one form of motion of water, and that the least prevalent in nature from an engineering point of view. After explaining under what circumstances this was the case, and, on the other hand, the conditions of motion to which it did not apply, he went on to describe the motion of water under three conditions which most commonly present themselves to the engineer,—viz., the motion of water in streams, in pipes, and the motion of ships in water. With regard to the first of these three, the theory was of but little use, and empirical laws of various degrees of complexity had been proposed, of which he mentioned the one of easiest application, and giving results probably as accurate as the others. In describing the motion of water in pipes, he pointed out that when the velocity was slow enough the motion came under the present theory, but after attaining a certain critical velocity, depending *cæteris paribus* inversely on the size of the pipe, the motion became sinuous, and an empirical law had been found to express the flow under these conditions. This law, owing to the more restricted conditions under which the flow took place, was of a more definite nature than in the case of streams.

Fire at New Cross.—Messrs. Clark, Bunnett, & Co., Limited, ask us to mention that the fire that took place at their New Cross Works on Sunday morning last was confined solely to that section of the building occupied by the foundry, and that beyond the stoppage of that portion the works are proceeding as usual.

The Tin-Plate Trade.—Messrs. Arthur Bird & Co., in their January circular, say:—"The course of the trade for the first six months [of 1886] at least was somewhat uneventful, the over-production which we dwelt upon in our last Report, and demonstrated by figures, effectually preventing remunerative prices from being obtained by makers. While, therefore, exports and consumption continued to increase, notwithstanding a shrinkage of prices all round in general trade, values steadily declined until they reached a point when several works were compelled to cease operations. The majority of the manufacturers were then forced to demand from their men a reduction in wages, and in a good many instances succeeded in obtaining certain concessions. These, however, were by no means general, and several large makers, failing any satisfactory arrangements with their workmen, have during the last two months closed their works altogether until better trade and more remunerative prices may enable them to restart, with a prospect of being able to keep their men and themselves regularly and profitably employed. The course of last year's trading may be gauged very closely by the fact that while the exports in 1886 show an increase over those of 1885 of about 37,000 tons, or nearly 12 per cent., the price of cokes has fallen from 14s. to 12s. 9d., a decrease of nearly 10 per cent. The prospects of the trade in 1887 are now what we would particularly call attention to, and to form any reliable estimate of future prices we must look closely at the present productive power. This is still perfectly able to supply the present visible requirements of those markets of the world which are exclusively our own, though we always hope that progress and development, aided by a long continued range of moderate prices, may so stimulate consumption as to ultimately benefit the producer. With the opening of the year 1887 one most important feature has shown itself which is not at all unlikely to have a very serious effect upon the values of tinplates. We allude to the somewhat sudden rise in the prices of nearly all the materials used in their manufacture, and, more especially, of hematite pig iron, as affecting the price of steel. The advance already amounts to about 10 per cent. without any corresponding improvement in tinplates, and should this rise continue,—and in the opinion of those best qualified to form a correct judgment market appearances favour this view,—prices must advance in proportion, quite irrespective of the relation of demand to supply."

Carbonic Acid in the Ground. — The amount of carbonic acid in the ground has been lately shown by Professor Wollny (we learn from *Naturforscher*) to depend, on the one hand, on the factors of decomposition of organic substances (heat, moisture, porosity), as affected by the physical nature of the ground and its covering; on the other hand, on the resistance which the ground presents, according to its mechanical state, to the escape of the gas. Ground-air seems to have most carbonic acid when the ground is at a slope of about 20 deg. Slopes facing south have most carbonic acid; those facing north least, though the difference is not great, as the two principal factors, heat and moisture, largely counteract each other. In drought, ground facing north has more carbonic acid. With equal quantities of organic matter there is more carbonic acid, the more finely granular the ground; and such ground hinders movement of the gas downwards as well as into the atmosphere. The air in ground shaded by living plants has considerably less carbonic acid than that in the bare ground, and in the latter it has less (in dry years, not in wet), than in ground covered by dead parts of plants.—*Nature.*

Building on the Clock House Estate, Clapham Common.—The Clock House Estate, on the east side of Clapham Common, is at present the scene of active building operations. The estate, which occupies about twenty acres, and which for many years was the residence of the late Mr. J. Kemp-Welch, was, with the mansion, sold about two years since for upwards of 50,000*l.*, with the view of its being laid out for building purposes. A few months since the materials of the mansion were disposed of, and the building having been cleared away, the estate has been laid out for building upon. It has a frontage to Clapham Common nearly 600 ft. long, its south boundary being Cavendish-road. Three new roads have been formed through the estate, running parallel with Cavendish-road, eastward, and already several new houses have been erected facing these various roads, and also in Cavendish-road, whilst fronting the main road, overlooking the common, several residences are in course of erection. The area of the estate will admit of the erection of about 400 houses of the "villa" class.

Registration of Plumbers.—A few days since, plumbers from Folkestone, Salisbury, Cardiff, Colchester, Leeds, and various districts of London, attended at the City and Guilds Technical Institute, Finsbury, to undergo practical examination in order to qualify themselves for registration. The examination included pipe-bending, joint-making, the formation of roof-gutters, cisterns, &c. After practical examinations in these branches, the candidates were required to answer questions prepared by the Board of Examiners, and directed to testing the candidates' knowledge of materials, construction, and sanitation. The Examiners in attendance included Mr. George Shaw, Chairman of the Registration Committee, and Messrs. Nurse, Gilbert, Titmas, Webb, Smeaton, R. J. Syne, and Ashdown, nominated representatives of the United Operative Plumbers' Association and of the Plumbing Trade of London. The candidates on this occasion were chiefly journeymen.

New Reservoir for Wallasey. — The increase in the population of this rising suburb of Liverpool has necessitated a greater supply of water; and with that view, some time ago, the Local Board of Wallasey decided to construct a new reservoir in the upper portion of New Brighton. After competition, the works were entrusted to Mr. J. Etheridge, contractor, Manchester. A few days since the water was turned on by the Chairman of the Gas and Water Committee (Mr. John Joyce). These works were designed by Mr. H. Ashton Hill, the Gas and Water Engineer to the Local Board. During the luncheon the contractor presented the Chairman of the Water Committee (Mr. J. Joyce) with a gold key, the facsimile of that used in turning on the water.—*Liverpool Journal of Commerce.*

Raffety, Thornton, & Co. (Limited).—We are informed that the directors of Messrs. Raffety, Thornton, & Co. (Limited) will, at the general meeting of shareholders on the 1st prox., recommend the payment of a dividend at the rate of 7 per cent. per annum (free of income-tax) for the half-year ended the 31st of December, 1886, making a dividend of 7 per cent. for the year, and carrying forward 1,098*l.* 19s. 5d.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Cooking Apparatus and Boiler	Barnet Union	*Official*	Jan. 26th	xix.
Earth-Drying and Storage Shed	Met. Asylums Board	J. Wallace Pegge	Jan. 29th	ii.
Wood Pavement	Folkestone Cor.	A. W. Conquest	do.	xix.
Sewers, &c.	New Malden Local Bd.	T. L. Heward	Jan. 31st	ii.
Construction of Reservoir	Northwich Local Board	H. Bancroft	Feb. 1st	ii.
Making-up and Paving Roads	Wandsworth Bd. of Wks	*Official*	do.	ii.
Town-Hall and Offices	Fulham Vestry	G. Edwards	Feb. 2nd	ii.
Stoneware and Fireclay Pipes, Cement, &c.	Southgate Local Board	C. G. Lawson	do.	xix.
Road Materials	Bexley Local Board	E. R. Boulter	do.	ii.
Reseating and Restoring Oak Panelling	Cor. of Exeter	E. L. Parsons	do.	ii.
Silencing Echo in Drill-Hall	16th L. R. V.	*Official*	Feb. 4th	ii.
Construction of Road	Met. Board of Works	do.	Feb. 8th	ii.
Miscellaneous Repairs, &c.	Tottenham Local Board	— De Pape	do.	ii.
Hospital for Infectious Diseases	Sunderland Cor.	*Official*	Feb. 10th	ii.
Road Materials	Com. of H.M. Works	do.	do.	i.
Restoration & Completion of College Buildings	Wales University Coll.	Seddon & Carter	Feb. 14th	ii.
Steel Dock Gates and Caisson	Barry Dock, &c., Co.	Barry & Brunel	Feb 18th	ii.
Erection of Hotel, High Beech, Essex	.....	D. Burnett	Feb. 23rd	ii.
Enlargement of Board School	Schl. Board for London	*Official*	Not stated	ii.
Horse Repository, New Kent-road	.....	Inkpen & Stallard	do.	ii.
Addition to Cottage Hospital, Bromyard	.....	F. R. Kempson	do.	xix.
Erection of Villa Residence, Norbiton	.....	J. T. Tabrum	do.	xix.
Works, Repairs, and Materials	War Department	*Official*	do.	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
District Surveyor	Met. Board of Works	Not stated	Jan. 26th	xvi.
Surveyor and Inspector	Braintree Local Board	do.	Feb. 8th	xvi.

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 10 0	7 0 0
Teak, E.I. ....load	9 0 0	14 0 0
Sequoia, U.S. ....foot cube	0 2 4	0 2 7
Ash, Canada ....load	3 0 0	4 10 0
Birch ,, ...load	2 5 0	3 10 0
Elm ,, ...load	3 10 0	4 10 0
Fir, Dantsic, &c. ....load	1 10 0	4 0 0
Oak ,, ...load	3 10 0	4 10 0
Canada ....load	3 0 0	6 0 0
Pine, Canada red ....load	2 0 0	3 10 0
,, yellow ....load	2 5 0	4 0 0
Lath, Dantsic ....fathom	3 0 0	5 0 0
St. Petersburg ....fathom	4 0 0	5 10 0

TIMBER (*continued*).	£. s. d.	£. s. d.
Wainscot, Riga ....log	2 15 0	4 0 0
,, Odessa, crown ....log	3 5 0	3 7 6
Deals, Finland, 2nd and 1st ....std.	7 0 0	8 0 0
,, 4th and 3rd ....std.	6 0 0	6 10 0
Riga ....std.	5 10 0	7 0 0
St. Petersburg, 1st yellow ....std.	8 10 0	14 0 0
,, 2nd ,, ...std.	7 0 0	8 0 0
,, white ....std.	7 0 0	10 0 0
Swedish ....std.	6 0 0	15 0 0
White Sea ....std.	7 0 0	17 10 0
Canada, Pine, 1st ....std.	17 0 0	29 0 0
,, ,, 2nd ....std.	11 0 0	17 0 0
,, ,, 3rd, &c. ....std.	6 0 0	8 0 0
,, Spruce, 1st ....std.	8 0 0	11 0 0
,, ,, 3rd and 2nd ....std.	5 0 0	7 10 0

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Deals, New Brunswick, &c.	5	0	0	7	0	0
Battens, all kinds	4	0	0	12	0	0
Flooring Boards, sq. 1 in., Prepared, first	0	9	0	0	13	0
Second	0	7	6	0	8	6
Other qualities	0	5	0	0	7	0
Cedar, Cuba ....foot	0	0	3	0	0	3½
Honduras, &c.	0	0	2½	0	0	3½
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4	0	0	7
St. Domingo, cargo average	0	0	4	0	0	7
Mexican ,,	0	0	3½	0	0	4½
Tobasco ,,	0	0	4	0	0	6
Honduras ,,	0	0	4	0	0	6
Maple, Bird's-eye	0	0	6	0	0	8
Rose, Rio ....ton	7	0	0	10	0	0
Bahia	6	0	0	10	0	0
Box, Turkey	5	0	0	17	0	0
Satin, St. Domingo ....foot	0	0	6	0	0	10
Porto Rico	0	0	7	0	1	0
Walnut, Italian	0	0	4	0	0	5

METALS.						
IRON—Bar, Welsh, in London....ton	4	7	6	4	15	0
,, ,, in Wales	4	2	6	4	7	6
,, Staffordshire, London	5	10	0	6	0	0
Sheets, single, in London	6	15	0	8	10	0
Hoops ,,	6	0	0	7	0	0
Nail-rods ,,	5	15	0	6	10	0
COPPER—						
British, cake and ingot ....ton	42	10	0	43	0	0
Best selected	43	0	0	44	0	0
Sheets, strong	50	0	0	51	0	0
Chili, bars	39	5	0	39	10	0
YELLOW METAL ....lb.	0	0	4	0	0	4½
LEAD—						
Pig, Spanish ....ton	12	15	0	0	0	0
English, common brands	13	0	0	0	0	0
Sheet, English	13	17	6	14	0	0
SPELTER—						
Silesian, special ....ton	14	12	6	14	15	0
Ordinary brands	14	10	0	14	12	6
TIN—						
Straits....ton	102	0	0	102	7	6
Australian	102	15	0	0	0	0
English ingots	105	0	0	0	0	0

OILS.						
Linseed ....ton	20	5	0	20	10	0
Cocoanut, Cochin	37	0	0	37	10	0
Ceylon	26	5	0	26	10	0
Palm, Lagos	23	10	0	24	0	0
Rapeseed, English pale	22	10	0	0	0	0
,, brown	21	0	0	21	5	0
Cottonseed, refined	18	5	0	20	10	0
Tallow and Oleine	25	0	0	45	0	0
Lubricating, U.S.	5	0	0	7	0	0
,, refined	5	0	0	12	0	0
TURPENTINE—						
American, in casks ....cwt.	1	8	0	0	0	0
TAR—						
Stockholm ....barrel	0	15	0	0	15	6
Archangel	0	11	6	0	12	0

TENDERS.

BARKING (Essex).—For the construction of precipitating and sludge settling channels, a pier and jetty, the erection of engine and boiler houses, workshops, store-sheds, superintendent's house and workmen's cottages, and the execution of numerous other works in connexion with the foregoing, for the purpose of the intended sewage precipitation works at the northern main drainage outfall, Barking-creek, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer:—

Perry & Co.	£421,000	0	0
Lucas & Aird	420,968	0	0
John Jackson	420,220	0	0
Williams, Son, & Wallington	415,600	0	0
Whittaker Bros.	410,321	14	7
W. Webster	407,862	0	0
J. Mowlem & Co. (accepted)	406,000	0	0

BROCKLEY.—For kerbing and making up Comerford-road, Brockley, for the Lewisham Board of Works:—

Woodham Bros.	£1,270	0	0
Farthing & Co.	1,196	0	0
Adams	1,120	0	0
Marshall	1,090	0	0
Mowlem & Co.	997	0	0
Kelsey	974	0	0
Woodham & Fry (accepted)	963	0	0

CARDIFF.—For erecting a residence at Llanishen, for Mr. P. H. Thompson. Mr. F. Baldwin, architect, Cardiff. Quantities by the architect:—

Thos. Gough	£1,735	0	0
Turner & Sons	1,598	0	0
D. J. Davies	1,570	0	0
Shepton & Son	1,555	0	0
G. Smalbridge	1,420	0	0
John Haines (accepted)	1,250	0	0

[All of Cardiff.]

HEREFORD.—For the erection of new premises, Eign-street, Hereford, for Mr. F. T. Boulton. Mr. W. W. Robinson, architect, King-street, Hereford:—

Partington	£1,280	0	0
Davies	1,255	0	0
Cullis	1,080	0	0
Hiles	1,077	0	0
Bower & Co.	1,005	0	0
T. Lewis (accepted)	945	0	0

[All of Hereford.]

LAMBETH.—For reconstructing the old Workhouse, Princes-road, Lambeth, for the Guardians of the Poor. Mr. Thos. W. Aldwinckle, architect, East India-avenue, Leadenhall-street. Quantities supplied:—

B. E. Nightingale	£22,500	0	0
J. Tyerman	20,795	0	0
Mowlem & Co.	19,421	0	0
Holloway Bros.	18,950	0	0
J. T. Chappell	18,727	0	0
F. R. Turtle	18,719	0	0
Newton & Idle	18,702	0	0
W. Johnson	18,559	0	0
H. Quennell	18,500	0	0
C. Wall	18,276	0	0
Turtle & Appleton	17,995	0	0
G. Stevenson	17,906	0	0
F. & H. F. Higgs	17,850	0	0
W. Downs	17,793	0	0
Holliday & Greenwood	17,777	0	0
Stephens, Bastow, & Co.	17,777	0	0
E. C. Howell & Son	17,646	0	0
J. Mills	17,580	0	0
Balsam Bros.	17,567	0	0
R. M. Priestley	17,500	0	0
E. Lawrence & Sons	17,487	0	0
Kirk & Randall	17,421	0	0
Prestige & Co.	17,382	0	0
W. Smith	17,178	0	0
C. Cox	16,839	0	0
H. L. Holloway (accepted)	16,043	0	0

LONDON.—For rebuilding on the sites of 385, 387, and 389, Oxford-street. Messrs. T. Chatfeild Clarke & Son, architects:—

Hall, Beddall, & Co.	£6,810	0	0
A. Scott	6,795	0	0
Cubitt & Co.	6,715	0	0
Nightingale	6,682	0	0
Clarke & Bracey	6,670	0	0
Holland & Hannen	6,612	0	0
Brown, Son, & Blomfield	6,500	0	0
A. Bush	6,483	0	0
Bywaters	6,453	0	0
Colls & Sons	6,437	0	0
C. Cox	6,380	0	0
Morter	6,340	0	0
E. Lawrance & Sons	6,235	0	0

LONDON.—For rebuilding on the sites of Nos. 391 and 393, Oxford-street. Messrs. T. Chatfeild Clarke & Son, architects:—

Cubitt & Co.	£3,744	0	0
Holland & Hannen	3,735	0	0
A. Scott	3,692	0	0
Clarke & Bracey	3,682	0	0
Hall, Beddall, & Co.	3,659	0	0
Bywaters	3,564	0	0
Nightingale	3,553	0	0
Colls & Sons	3,519	0	0
A. Bush	3,474	0	0
C. Cox	3,430	0	0
Morter	3,420	0	0
Brown, Son, & Blomfield	3,420	0	0
E. Lawrance & Sons	3,320	0	0

LONDON.—For engineering works at the old Workhouse and Infirmary, St. John's Hill, New Wandsworth, for the Guardians of the Wandsworth and Clapham Union. Mr. Thomas W. Aldwinckle, architect, East India-avenue, Leadenhall-street:—

Jeakes	£4,850	0	0
Davis	3,750	0	0
May	3,395	0	0
Goddard & Massey	3,042	0	0
Berry (accepted)	2,779	0	0

LONDON.—For rebuilding 73 and 75, Lower Thames-street. Second contract. Mr. Banister Fletcher, architect:—

J. O. Richardson (accepted)	£1,585	17	6

PONTYCYMMER (Wales).—For erection of schools at Pontycymmer, for the Llangeinor School Board. Messrs. Seddon & Carter, architects, Westminster and Cardiff. Quantities by Mr. Norman Wight:—

E. Thomas, Neath	£2,269	0	0
Jenkins, Bros., Swansea	2,260	0	0
D. C. Jones & Co., Gloucester	2,240	0	0
N. Francis, Pontycymmer	2,147	11	10
J. Rattray, Pontycymmer	1,990	10	0
G. James, Bridgend	1,950	0	0
C. Jenkins & Son,* Blaengarw	1,795	0	0

* Accepted subject to certain modifications.

READING.—For a detached block of eight cottages to be erected in Weston-street, Reading, for Mr. J. Bligh Monck. Messrs. Cooper & Son, architects, Blagrave-street, Reading. Quantities supplied by the architects:—

W. Goodchild	£1,580	9	0
Patience & White	1,579	0	0
H. Higgs & Sons	1,525	0	0
G. Wernham	1,521	5	0
T. Pilgrim	1,375	0	0
G. Pilgrim	1,373	0	0
J. C. Cooke	1,198	0	0
D. Taylor (accepted)	1,080	0	0

[All of Reading.]

ST. MARY CRAY (Kent).—For alterations and decorations at a private residence, near St. Mary Cray, Kent. Mr. St. Pierre Harris, architect, Basinghall-street, E.C.:—

W. R. Taylor, Orpington	£475	0	0
H. Somerford & Son, Clapham	328	0	0
Thos. Knight, Sidcup	424	0	0
Fras. Wood, Chislehurst	306	13	0
Taylor & Son, Bromley (accepted)	300	0	0

WILLESDEN.—For making and draining with sewer and surface water drains, a new road on the Pheasantfield Estate, Willesden, for the Imperial Property Investment Co., Limited, Moorgate-street. Mr. G. H. L. Stephenson, surveyor:—

Bell	£3,050	0	0
Felton	2,745	0	0
Cooke & Co.	2,715	0	0
Pizzey	2,527	0	0
Walker	2,259	0	0
Jackson	2,254	0	0
Wilson (accepted)	2,235	0	0

WOKING (Surrey).—For constructing a new road 1,600 feet in length and 36 feet wide joining Palmerston-road and Horsell Common, for the Directors of the National Liberal Land Company, Limited. Mr. George Pooley, surveyor, Charing Cross:—

Stephen Kavanagh, Surbiton	£1,031	12	4
Samuel Chafen, Rotherhithe	990	0	0
William Carter, Leytonstone	923	16	5
Jesse Williams, Woking	894	16	3
William Nicholls, Wood-green	837	0	0
Alfred & J. Gale, Woking	759	0	0
James C. Trueman,* South Hackney	749	0	0

* Accepted.

[Surveyor's estimate, £800.]

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, W.C., *not later than Four p.m.* on THURSDAYS.

TO CORRESPONDENTS.

***Registered Telegraphic Address*, "THE BUILDER, LONDON."**

W. F. L.—T. R.—W. E. M.—W. S. W.—W. S.—L. & Son.—V. S.—J. M. & Co.—G. H. G. (below our mark).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TWELVE GOLD AND SILVER MEDALS AWARDED.

ZINC ROOFING.

F. BRABY & CO.

LONDON. ++ LIVERPOOL. ++ GLASGOW.

VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.

NO SOLDER. NO EXTERNAL FASTENINGS.

Particulars on Application. *Chief Offices:—352 to 364, EUSTON ROAD, LONDON, N.W.*